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HIGH TIMES JANUARY



Everything sofresh farms grows is Clean Green Certified—a program that regulates cannabis products to certify they're grown organically.

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Aeroponic cloning results in successfully rooted cannabis cuttings quickly and easily. Learn tips and tricks for prosperous cloning from industry pioneers, EZ-Clone. *By Erik Biksa*
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We take a look at two Cannabis Cups—a return to one of our favorite locations in the Midwest, and a first-ever trip north of the border to beautiful British Columbia.



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A Friend with Weed is a Friend Indeed

When marijuana is a big part of your life, you want to be able to share cannabis with the people you care about. No one wants to have to hide their use of pot—how can you really be close to someone if you're unable to share with them something so important to you?

But what do you do when a friend or family member is reluctant to toké? Maybe they had a bad experience in the past or maybe they've bought into reefer madness propaganda.

Fortunately, High Times has you covered! Check out our handy guide: "How to Properly Introduce a Friend to Herb." We present five easy steps to ensure a positive and enjoyable experience for first time users. This easy to follow guide will help you share your favorite flower with the people you care about. **Visit hightimes.com for more.**



We Want To Hear From You!

Tweet your best high observations and comments our way @HIGH_TIMES_Mag for a chance to be featured on this page! And be sure to follow us on Facebook (Facebook/HIGHTIMES-Mag) and Instagram (@hightimesmagazine) for all the latest news as it's happening!

@a_bit_sketchy: @HIGH_TIMES_Mag My dad always said a bag of weed will get you through the hard times.

@cinnamon_carter: @HIGH_TIMES_Mag If Trump pressed for legal weed instead of a wall on Mexico he would go down in history as the most popular president ever.

@420WhiteRasta42: @HIGH_TIMES_Mag Low temp dabs all day.

@jessicadelfino: Has a legal state changed its state flower to cannabis yet? Because that'd be pretty cool and probably go viral, right @HIGH_TIMES_Mag?

@BambiCraigbambi: @HIGH_TIMES_Mag @netflix #disjointed I have watched it several times. Its so funny yet deals with real issues. Must watch

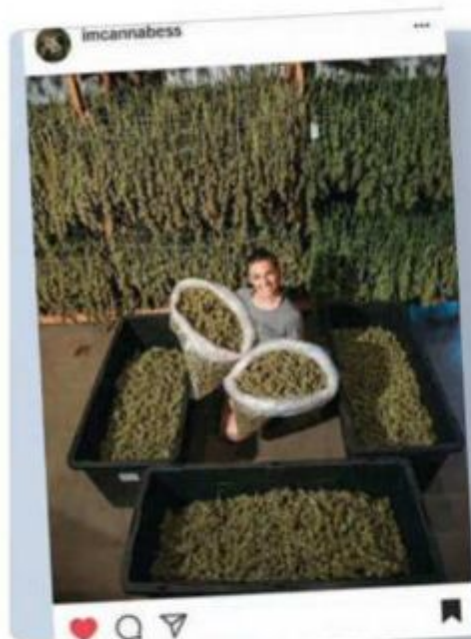
@HERBnARTWORK: @HIGH_TIMES_Mag Man, there are NO flavored papers in Mexico! Just Zags. And get this, no blunts, at all! They don't even know what I'm talking about.

@KoreLutalo: @HIGH_TIMES_Mag I made a tomato sauce and pizza out of hash oil and butter. Ate one slice, got the munchies then finished the whole 16" pie. Best for sure!

@NawtyLisanne: @HIGH_TIMES_Mag I can't smoke plant matter because of my lungs. I vape instead.

@dabbindad: @HIGH_TIMES_Mag It would be a smart business move to start with cbd, no other retail chains do so money money money

@derekb808: @HIGH_TIMES_Mag We need to change these arcane laws that were put in place to keep down an entire race of humans



On Instagram

It would appear that reports of a pot shortage are greatly exaggerated. There doesn't seem to be a lack of pot in Washington State, where @lazybeegardens is hard at work producing beautiful, organic, Clean Green certified cannabis. Intrepid pot examiner @imcannabess dropped by Lazy Bee to get an up close and personal look at the latest harvest and it's an impressive sight to behold.

While a number of locales on the verge of instituting recreational marijuana sales contemplate how to keep enough product in stock to cover their customers, this serves as a reminder of all the hard-working farms out there producing high-quality cannabis on a regular basis. Learn more about another such farm ("Inside softesh farms," page 68) in this issue!

Smoking Poll

Cannabis consumers across the country are losing employment opportunities thanks to invasive workplace drug testing. Even in legal pot states, workplace drug testing continues to ruin lives. This month, we're investigating the drug-testing industry—including the latest trends in beating a drug test. Because this is an issue that impacts so many marijuana users, we decided to ask our readers about their experiences.

When asked, does your company drug test, a surprising 41 percent of *HT* readers responded "No, not at all." While this could simply be the result of our readers working jobs that eschew drug tests, it could also be a sign of the industry losing the broad support it enjoyed in the 1990s and early 2000s. Twenty-five percent of readers said, yes, their company does drug test and 24 percent responded, "Only before starting a job." Just 11 percent of readers are randomly tested.



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The Failures of Drug Testing

As the old joke around the *High Times* office goes, should the company ever institute a drug-testing policy, it would be to ensure that the staff is always at least a little bit stoned. The reality is, though, we know how lucky we are that our company would never drug-test us. Sadly, many employees across the country are not so fortunate.

Workplace drug testing can be traced back to an executive order from President Ronald Reagan in the throes of the 1980s War on Drugs. The '80s, which combined 1960s-era Drug War paranoia with a "Greed Is Good" mantra, proved the perfect decade for workplace drug testing to take root. Before long, drug testing became a multibillion-dollar industry as American businesses opted to invade the privacy of their employees and job seekers—often in return for financial favors from the government.

The issue of drug testing is especially pertinent to marijuana users as cannabis can remain in the system far longer than other substances—sometimes weeks after intoxication. So, naturally, marijuana is the most common drug found in screenings, meaning a disproportionate amount of weed users are losing employment opportunities.

Incredibly, drug testing remains prevalent in states that have legalized medical or recreational pot. So even legal cannabis consumers responsibly smoking during their off-hours are risking their livelihoods.

Fortunately, there are some positive developments pointing to the eventual demise of the drug-testing industry. This month, we're examining the industry's history and current trends in "Drug Testing 101."

Also this month, our cultivation correspondent samples the pristine pot of Oregon's sofresh farms, Nico Escondido offers advice for achieving the ideal atmosphere in your growroom, the *HT* staff breaks down the two most recent Cannabis Cups and we find out what happens when thousands of Juggalos invade the nation's capital to take on the FBI.

Enjoy issue 504 of *High Times* magazine!

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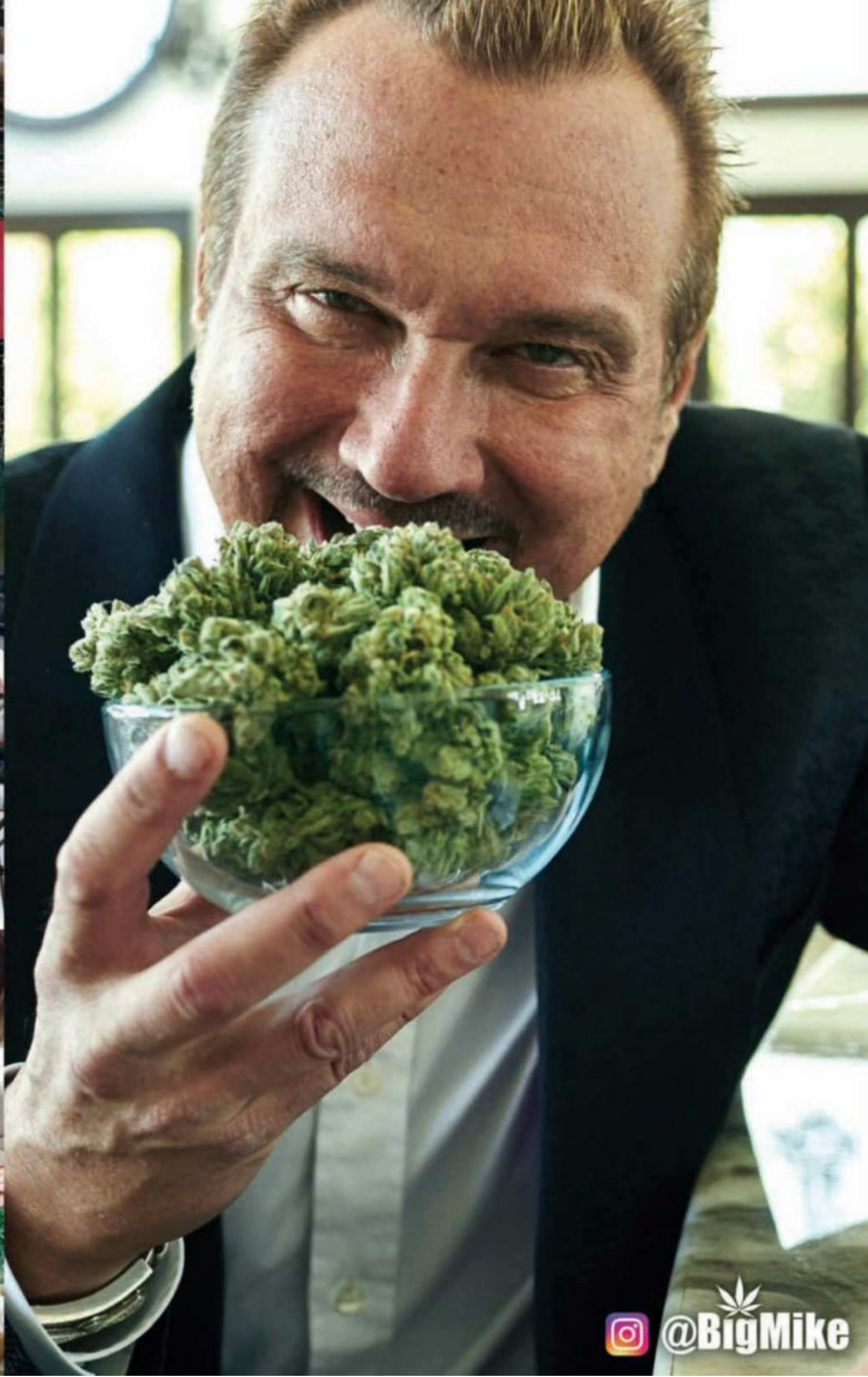
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In Prison for Pot

My husband is sitting in Lebanon prison (Ohio). He was my teenage love, and I am still hopelessly devoted to him. We have four children together, and I take at least one or two of them with me each week to visit. There's a limit on the number of visitors to each inmate, so we won't be a family until his release next November.

Nick, my soulmate and now inmate, is serving a 2-year sentence for an F3 in which he pled no contest to the cultivation of marijuana. An act that's legal in some states, and even in Ohio for medical use. Nick never had more than a speeding ticket prior to his arrest. There was no mandatory sentencing attached to the felony, and there was no reason to set his bond at \$250,000 and to deny his appellate bond completely.

We are appealing his case now while he sits in prison. He's already served 13 months of his 24-month sentence. Two years may not seem like a lot, but it is if you're living it as an inmate or a single mom. If I don't hear from him at our scheduled time each night, I panic. My heart races, I struggle to breathe, worried that he might have been hurt by another inmate, that he might have been sent to the hole, or worse, that he might be dead. My husband is not a violent person, but when in Lebanon, anything can happen. He does not belong in prison, especially over pot.

*Mindy
Ohio*

Is There a Doctor in the House?

I'm a medical cannabis card holder in Massachusetts, born and raised south of Boston. I just moved back from Ireland at the beginning of this past summer. My state passed the medical bill right around the time I was leaving the country and the only good news from this past election that I received over in Dublin was that my hometown voted to legalize.

My coming home also marked a turning point in my life. After a prescription drug and alcohol problem that spanned a decade, I came home in April of this year and checked myself into rehab. I'm now eight months clean. I'm finally dealing with some severe underlying mental health issues from my past. I have BPD (borderline personality disorder), anxiety and insomnia. Medical cannabis has done absolute wonders for me. Instead of being on a combination of different mood stabilizers, benzos and sleeping pills, I



“Instead of being on a combination of different mood stabilizers, benzos and sleeping pills, I have a single natural alternative.”

have a single natural alternative.

So, things are looking up but I kinda hit a wall when it came to finding a therapist not only sympathetic to my choice of medication but a supporter of it. Getting my medical card was easy enough. But every “natural health center” and “holistic treatment center” I contact only sells medical cards and renewals, mostly for cash only and offers no other services. Access to medication is great, but now the real work of using it as a tool to fully balance my mind and body needs to be done with professional therapy.

I was surprised that in Boston, home of the most cutting edge medical and mental-health fields in the world, I'm having such a hard time finding a sympathetic doctor. I know they're out there, but is it just still too new or too taboo? It's a shame because I feel my hometown has the chance to be on the front-line of the medical cannabis movement, helping to bring this beautiful plant into the light for its amazing healing properties. And I believe that it's only through a mix of scientific advancements in medicine and a return to organic, holistic practices that we will find the best answers. Treat it from all

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angles—mind, body and soul. I would hope that doctors wanting to openly work with patients using cannabis in the mental-health field could do so in Massachusetts without fear of backlash.

*Jesse
Boston, MA*

Change Up

I would like to congratulate you on your recent 150 milestone as well as your significant contributions to the changing attitude towards the use of marijuana.

I have been reading your magazine on and off for the past couple of decades and note that, while always relevant, I feel that the revolution in attitudes towards marijuana requires a change in your focus from growth-oriented stories and articles to more of a consumer-oriented focus. A welcome change brought about by legalization is that much fewer people will be growing their own and will prefer to purchase from legal outlets.

I think the shape this could take is an increase in reviews and articles about products that the user would purchase or that would enhance the user experience.

I think your editorial staff, whom I assume are all users, should get together and brainstorm possible changes in the magazine's focus to reflect what users would be interested to know.

SE

Thanks for the suggestion (and, for the record, the milestone was 500 issues). We work hard to provide a wide range of content for readers who come to us for all things marijuana and we're always thinking about how to improve that content. However, we believe that people will always be interested in growing their own cannabis, regardless of its legal status. And we intend to teach them, as we have for the last 43 years.

Canna Sutra

I'm new to the whole pot thing so it seems like every experience is revelatory, but has anyone else noticed how great marijuana is for sex? I had an experience recently and, well, I won't go into detail but, damn. If you haven't tried it yet, I definitely recommend that you try it. Like, tonight.

*Sarah
New Mexico*

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SOFRESH FARMS Rows of organic marijuana plants thrive as they flower away on this Oregon pot farm. Learn all about how they combine old and new techniques to cultivate clean green craft-quality cannabis on page 68. *Photo by StinkBud.*





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CANNABIS CUPS Marijuana and hip hop legends Method Man and Redman kept the crowd lit at the High Times Cannabis Cup in Michigan. Find out what went down, who performed and who won the big prizes for flowers, concentrates, edibles and more on page 100. *Photo by Jason Faatz*







ATMOSPHERE Controlling the atmosphere in indoor gardens is essential to the end result. Learn tips and tricks for dialing in your environment for increased yields and potency with Nico's "Ideal Atmosphere" feature on page 44. *Photo by Nico Escondido*

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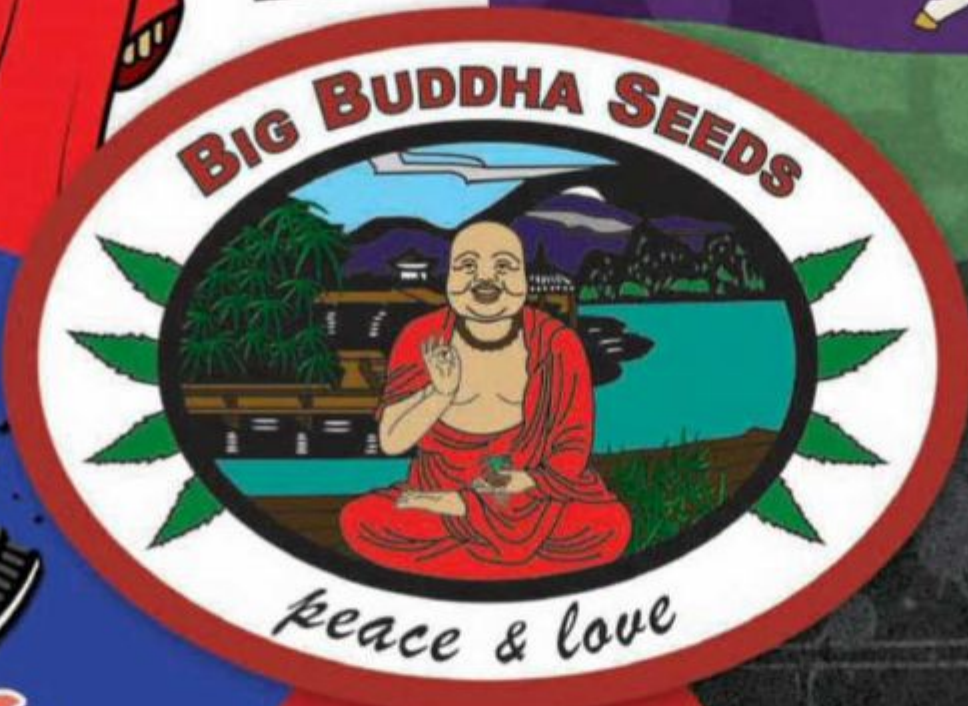


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Style

Ganja Gadget

The LEVO appliance makes small-batch, on-demand infusions right in your kitchen. p.30



Entertainment

Run The Jewels

Dynamic rap duo Killer Mike and El-P tackle stereotypes while making great music. p.34



Will Gorilla Glue #4's name really stick?

A Strain by Any Other Name

There are hundreds of cannabis strains, and each has its own ancestry, characteristics and name. Some of those names are testing the limits of trademark law. *By Mike DiPaola*

As marijuana goes legit, we still see vestiges of the outlaw days. When the market was black, cultivators who created strains named them whatever they wanted, using even the brand names of established products—who was going to complain? Today, as weed comes out of the shadows and onto the shelves of legal dispensaries, some of these strain names are probably facing extinction.

Consider Gorilla Glue #4, a perennial Cannabis Cup winner. Although the strain was born in a legal environment (medical pot was made licit in Nevada in 2012), its creators at GG Strains are now facing a lawsuit filed by its namesake,

the Gorilla Glue Company, maker of a well-known adhesive. The glue maker is alleging trademark infringement, unfair competition and cybersquatting (the practice of registering well-known names as internet domains). GG Strains is fighting to keep the name, but the company is also reportedly rebranding its popular strain as GG#4, at least until the legal mess is straightened out.

We asked Alison Malsbury, an attorney with the Seattle law firm Harris Bricken who specializes in corporate and intellectual property—in particular with cannabis, food and alcohol—if GG Strains might have to forfeit the name of its

signature strain. Noting that she had not read the pleadings in the case, Malsbury said the outlook did not look great for the genetics company.

“My first impression is that it’s highly unlikely that these people are going to be able to continue to use the Gorilla Glue name for a strain of marijuana,” Malsbury said. “First of all, the name is exactly as a trademarked name, and I believe the logo is even a riff off the Gorilla Glue logo. I think there’s really no question that they’re intentionally using the Gorilla Glue name to play off the notoriety of the more famous mark, and that’s something that’s not allowed under trademark law.”

One problem for GG Strains is that the company is pitted against a King Kong-sized opponent. “Keep in mind that it’s very much a power dynamic,” Malsbury said. “Gorilla Glue is a big company. It’s pretty tough for small cannabis [companies] to go up against that.”

« Indeed, the Gorilla Glue (weed) people are acutely aware of this disparity. “We’re not millionaires, we’re cannabis breeders and cultivators,” GG Strains’s Ross Johnson told the *Cannabist*. “Most people have backed down from corporate businesses, so no case has set precedent as of yet. Down the line, this will set the precedent.”

Also this year, the Girl Scouts of the USA sent a cease-and-desist letter to Magnolia Oakland and other California dispensaries, which, like a lot of weed merchants, were selling a beloved product called Girl Scout Cookies. The dispensary quickly complied.

One Las Vegas dispensary is trying to evade the wrath of the little campers by calling its strain Gurl Scout Cookies. So far, the Girl Scouts haven’t taken legal action, but they did release a statement: “We were recently made aware of local dispensaries using the Girl Scouts trademarked name, or a variation of our trademarked name, to sell their products... ‘Girl Scout Cookies’ is a registered trademark dating back to 1936. Our famous cookies are known the world over for their delicious flavor and we do not want the public to be confused by unauthorized products in the marketplace.”

The Vegas evasion probably won’t

One Las Vegas dispensary is trying to evade the wrath of the little campers by calling its strain Gurl Scout Cookies.

work, Malsbury said. “The USPTO [United States Patent and Trademark Office] doesn’t recognize minor differences in spelling like that. So, if you change an ‘i’ to a ‘u,’ it sounds the same, the overall impression is the same. You’re vulnerable.”

I asked Malsbury about some other strain names that might be problematic—Jack Sparrow, for example. “I think referencing a fictional character—that’s not so clear-cut,” she said. “It depends if Disney has the name trademarked for some reason. If they don’t, it might be fine.” In fact, there are currently at least five separate trademark applications filed with the USPTO by Disney Enterprises, Inc. for “Jack Sparrow,” intended to cover a prodigious variety of merchandise, from action figures to coloring books to wall clocks.

What about Jedi Kush and Skywalker OG? “Going up against Lucas and the Star Wars empire, I’m inclined to think that they have their trademarks locked down,” Malsbury said.

Going through the ever-growing list of strain names, it’s a safe bet that trademark law will put the kibosh on some of these brands if the entities that own the rights to the names decide to get litigious. Fruity Pebbles and Juicy Fruit, with gigantic corporations laying claim to the brands, come to mind. Names that riff off the names of famous people—such as Obama Kush or Berry White, say—are in legally questionable territory as well.

So, whether you create or sell strains of cannabis, it behooves you to take care with your nomenclature and to be original. Cultivators and dispensaries—and really anybody who develops a new product in the cannabis industry—are going to have to play by the same rules as any other business.

“Do some due diligence,” Malsbury advises. “Do a little Googling. If you’re choosing a name that’s not very unique and there are a lot of products with the same name, you are probably going to run into problems. So, be creative!” 🌿

HIGH FIVE

Marijuana on the Move

Pot is the hot-button issue entering 2018, with many interesting developments on the horizon. *By Mark Miller*



New Legal Sales

In California, pot czar Lori Ajax is ensuring that the Golden State doesn’t undergo a marijuana shortage like the one that plagued Nevada in 2017. One strategy Ajax is exploring involves granting temporary four-month licenses to cultivators to produce a suitable supply ahead of the official kickoff of legal sales in 2018. In Massachusetts, Governor Charlie Baker signed legislation in the summer of 2017 that officially legalizes retail sales of recreational pot beginning July 1, 2018.



Canadian Cannabis

Canada’s rollout of legal cannabis is hitting some speed bumps. Technically, the Great White North has an obligation to abide by the United Nation’s 1961 drug treaty outlawing weed worldwide. Of course, Canada could get around the UN issue by amending the Constitution—although such a move is likely not politically feasible. Or, like Uruguay opted to do when that country legalized weed in 2017, Canada could just ignore the outdated UN treaty. The country is still on track to legalize pot July 1, 2018.



Higher Education

Commencing with the 2018 fall semester, Niagara College in southern Ontario, Canada, will offer a one-year postgraduate degree in the production of commercial cannabis. As reported by the *National Post*, this program will address the dire need for cannabis cultivators across Canada as the country plans to legalize recreational weed. In the US later this year, Ohio will select a college or university to lab-test medicinal pot before it’s sold to patients, a mandate included in the state’s 2016 law.



THC Tech

Cannabusiness recruiting service Vangst Talent Network, which connects professionals with careers in the pot industry, is poised to become even more efficient by utilizing algorithmic matching later this year. On the product side, the Breeze Smart Inhaler is expected to hit markets in early 2018. Touted as the world’s first “smart vaporizer,” the Breeze allows for convenient consumption while tracking and recording the medicinal effects of cannabis to maximize health benefits for users.



Hemp, Hemp Hooray

As reported by *nasdaq.com*, Hemp Inc.’s 70,000-square-foot cannabis-hemp-processing facility is the largest in the Western Hemisphere. Such a massive production capacity is contributing to North Carolina’s projected status as the largest producer of industrial hemp in the United States in 2018. That state is part of a new American “hemp hub” that includes West Virginia, Virginia and Kentucky. In Jamaica, regulations to guide a newly established hemp industry should be in place later this year.

THERE GROWS THE NEIGHBORHOOD

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Bud
copter
down

Drones Away

We were really looking forward to the day when robots would bring us our bud. Unfortunately, that day won't be anytime soon, at least not in California. The state's Bureau of Cannabis Control has preemptively put the kibosh on the use of robotics as kush delivery systems—neither drones nor autonomous vehicles will be utilized. But this is not an attack on new technologies, because even bicycle delivery is verboten. According to the BCC's regulations released in September, "Cannabis goods will be required to be transported inside commercial vehicles or trailers. Transportation may not be done by aircraft, watercraft, rail, drones, human powered vehicles, or unmanned vehicles." *Ars Technica* reports that the new regs will harsh the mellows of start-ups like M Deliverers, Eaze, Trees Delivery and others that have promised or demonstrated dank drone deliveries. It will be interesting to watch how Silicon Valley reacts to the restrictions; nobody likes it when innovation gets stifled.

The Kids Are Alright

When states consider legalizing weed, pearl-clutching anti-pot people voice their loudest concerns over *the children*. Won't kids turn into hopheads if weed is readily available? So far, the answer is "No, not really." The latest data comes out of Washington State, which went full legal in 2012, with the first pot shops open for business in July 2014. The Washington State Institute for Public Policy, which is required to conduct periodic cost-benefit analyses of legalization, reports that pot use among students in the sixth, eighth, 10th and 12th grades was stable or has fallen slightly in the three years of legalization. The WSIPP also found that fewer adults were seeking publicly funded treatment for abuse, without going so far as to say that legalization caused the decline. The findings jibe with research conducted by the National Bureau of Economic Research, which also found no increase in teen pot use.

KEYSTONE CROPS



Something new is coming to Pennsylvania, and it happens to be something old: hemp. This year, 14 sites around the state are growing hemp for research purposes, in anticipation of the inevitable changes in laws that will allow commercial grows of this harmless plant. Although hemp, like its dank cousin, is classified as a Schedule I drug, the Pennsylvania Hemp Industry Council is confident that the pilot program is a precursor to a fully legal agricultural sector. The *Philadelphia Inquirer* reports that the state will likely allow more grow-space acreage next year, and that there will be a concerted effort to reclassify hemp in order to get the feds out of everybody's business. "If we can do that, we can commercialize hemp and it won't have to stay a research project," said Russell Redding, the state's secretary of agriculture. "But it's going to literally take an act of Congress."



Toker face

Gaga for Ganja

Lady Gaga is no stranger to the green, and she is refreshingly candid about her cannabis consumption. In her new behind-the-scenes Netflix documentary *Gaga: Five Foot Two*, the credits have barely begun before she is relating what it's like to be toking hard in the presence of another of the planet's great divas. "That was the night I gave Beyoncé, like, a panic attack," Gaga says. "I don't know, I just always feel like when I'm with her and Jay-Z, I'm always like hanging out in the corner with like nine joints hanging out of my mouth being like, 'Whaaaaat's up?!' and she's like, 'You're not a lady but why? How is this working?'" Gaga, who once told the world she smokes 15 or more spliffs a day, uses the chronic to treat the chronic pain of fibromyalgia. You deserve every toke, Lady G, and don't ever let anyone tell you otherwise.

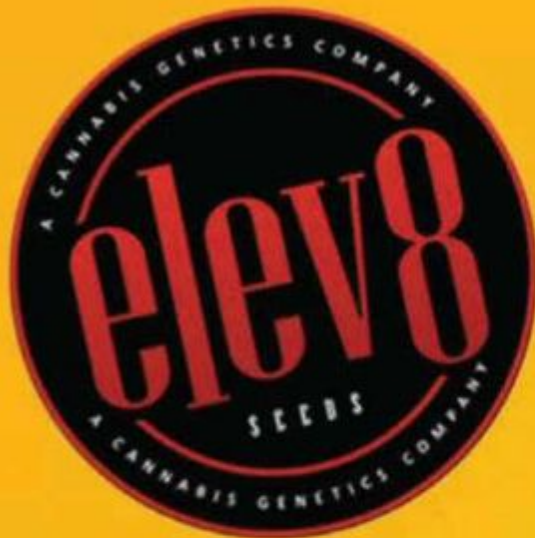
Our Robot Overlords

In fact, there is a role for robots in the cannabis industry. A company in Seattle recently unveiled BudBot, "a robotic cannabis packaging machine."

The robotic arm requires a human operator to load containers of bud, which the device then weighs, sorts

and places into 1-, 2- or 3.5-gram packages. While that doesn't exactly sound like the singularity has arrived, the company claims the robot can reduce labor costs (i.e., eliminate jobs) as well as cut down on overfill—the amount of loaded product over the listed weight—to the tune of \$11,000 per 100 pounds of bud processed. According to the company website, "One of the primary goals was also to design in the careful handling of such a fragile product to achieve the highest level of trichome retention and product efficacy compared to other automation," which sounds like a robot has already taken over copywriting duties.

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Charities Just Say No

Organa Brands, a Denver-based multi-tiered cannabis company, has done very well since legalization and, like a lot of cool cannabis businesses, likes to give back to the community. The problem being, though, is that some charities do not want support from marijuana companies, at least not publicly. *Forbes* reports that organizations such as Wounded Warriors, the American Cancer Society and the Children's Hospital Foundation have all turned down Organa's goodwill. "It felt like a slap in the face," said Chris Driessen, the president of Organa Brands. "Because the message was essentially you're a drug dealer." Organa Brands is the parent company of vape giant O.penVAPE, as well as Bakked, District Edibles, Magic Buzz and Organa Labs. Some organizations are quite proud to work with Organa, including Grow for Vets USA, the Denver Rescue Mission and others. In fact, the Denver Rescue Mission was delighted to receive both donations and volunteers from Organa: "We had 29 people at 5 am the day before Thanksgiving. Certainly not the image of stoners that people expected."

Walk This Way

Regular users of weed walk differently than nonusers, according to new research published in the journal *Drug and Alcohol Dependence*. The researchers said "the aim of the current study was to investigate balance and walking gait in adults with a history of cannabis use," and so that's what they did, finding that stoners moved their knees faster when stepping forward and tended to move their shoulders less than non-stoners. The study's lead author, Verity Pearson-Dennett of the University of South Australia, told *PsyPost* that the research filled a need. "Most of the research on illicit drug use focuses on long-term changes in cognition and psychological well-being," Pearson-Dennett explained. "Illicit drugs exert their effects by changing the levels of neurotransmitters in the 'pleasure centers' of the brain, but these neurotransmitters are also very important in movement." Future research may investigate whether the amount of cannabis, or the particular strain consumed, also has an effect on gait.

VEGAS LATE NIGHT



What could be better than the widespread legal availability of our favorite plant and medicine? In Las Vegas, the answer is "More, please." While city code makes dispensaries shut down between 3 and 6 a.m., the City Council unanimously voted to let one dispensary—Oasis Cannabis—remain open 24/7. According to the *Review-Journal*, Mayor Carolyn Goodman abstained from voting, as her son owns an interest in cannabis companies. While this isn't the only dispensary open around the clock, it is the only all-nighter located near the Vegas Strip. A couple dozen more pot shops in Clark County are expected to get the full-on treatment soon. When asked why Oasis needed the three extra hours afforded by the ruling, the dispensary's CEO and co-founder Benjamin Sillitoe said his company was only trying to give customers what they want: "We have people lined up at our door at 6 a.m., and [we] are rushing people out at 3 a.m."



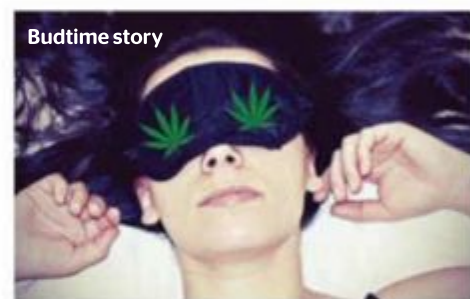
Al comes around.

Franken Signs On

Senator Al Franken (D-MN) has been doing his homework. A year ago, when asked about cannabis policy in a *BuzzFeed* podcast, he admitted to a knowledge gap on the subject, saying, "I'm not the guy to ask on this." As a representative of a med-pot state, "I should know more," the senator added. Franken has made good on his promise to bone up on the issue, because in recent weeks he has been signing on to assorted cannabis legislation, including the bipartisan Compassionate Access, Research Expansion, and Respect States (CAREERS) Act of 2017. *Forbes* speculated that Franken, who is "on a bit of a marijuana bill cosponsorship spree," is staking out dank ground in anticipation of a possible 2020 presidential run. Franken is not the only Minnesotan pol going for the green: At least five of the candidates in this year's gubernatorial race have declared their support to make the North Star State fully legal.

Bedtime for Bonghitters

Why do we toked up? For many stoners in the Denver metro area and its environs, the answer is simple: to get a good night's sleep. Surveys conducted by Houston-based Consumer Research Around Cannabis show that a strong plurality of users do so for the soporific benefits of good bud. The research group polled 1,258 cannabis users on why they use pot, and it turns out that nearly half of them do so to help themselves sleep and to treat chronic pain. Many respondents said they were treating depression or anxiety, while about a fourth said they were doing so for the partying. The surveys also paint a paradigm-shifting picture of the average stoner: Most have full-time jobs and live in two-income families, with household incomes of \$50,000 or more, and nearly half have IRAs or 401(k)s. The surveys also reveal the profile of the average non-user. According to Consumer Research Around Cannabis veep Jeff Stein: "Those that now disapprove tend to be affluent, male, baby boomers, who like country music, hockey, they are on a diet, and go to church regularly."



Budtime story

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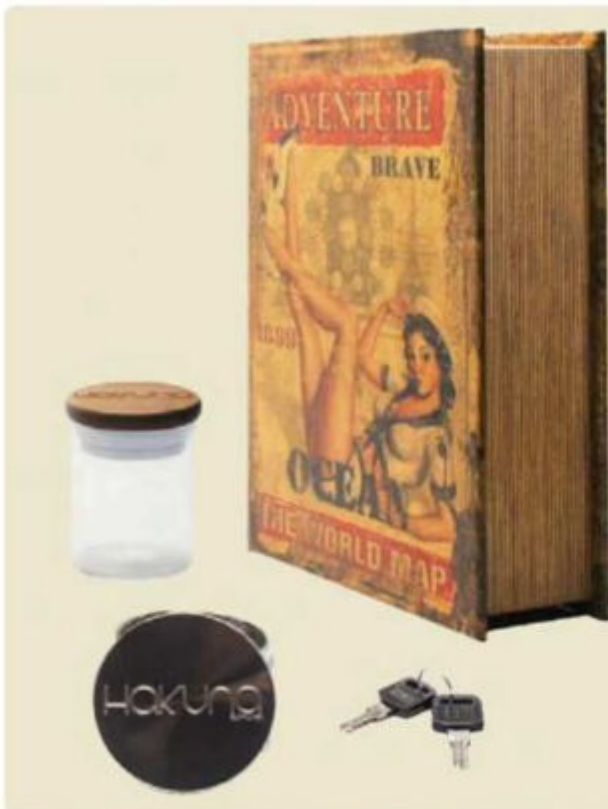




GO GO GANJA GADGET

As easy as making coffee or tea? The LEVO appliance aims to make oil infusion into a one-two-three mess-free countertop experience. If you use a Keurig for your caffeinated bevies, you'll definitely dig the modern LEVO unit, which makes small-batch, on-demand infusions.

The machine uses a patented gentle steeping process to extract all the goodness from your herb without burning it. This method substantially reduces the amount of chlorophyll that ends up in your butter or oil, making for a much less "weedy" taste. You can even get creative and add other herbs to your infusion for flavor and color: lavender, vanilla, rosemary—the options are endless. Just pop your cannabis and other herbs in the steeping basket, add your choice of butter or oil to the machine, set the timer and heat settings, and the ingenious gadget does the rest—it even has a child lock so you can leave it brewing worry-free. No more double boilers or cheesecloth needed! The LEVO is an investment at \$199, but if you're a frequent home-edibles maker, you'll reap the rewards right away. Added bonus: The components are dishwasher safe, making for a super-easy cleanup. levooil.com



SPOTLIGHT

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If you need to keep your stash discreet, Hakuna Supply has just the storage case for you. The locking book box looks like a sophisticated addition to your bookshelf—but inside the rustic leather cover, under lock and key, is a good old-fashioned hollowed-out hiding place. There's something so satisfying about unlocking the metal plate and opening it up to reveal your precious buds—like you're a real-life Hardy Boy. The boxes are felt-lined and come furnished with a solid four-piece grinder, a glass pop-top jar and two keys. Secure your weed in style! \$59.95 and up, hakunasupply.com



CHICKS LIT

The steady flow of new cannabis products is ever-widening, as more and more novice consumers turn to legal weed as a safe way to unwind. Marketing to the "cannabis curious" is a huge new industry, and savvy designers are stepping up to meet demand. One new company, W!NK, aims to enhance the vaping experience for women in particular.

The W!NK vape pen doesn't look out of place in a cosmetic case or evening clutch—a magnetized cap cloaks the mouthpiece, so the pen nestles in nicely with your lip gloss and mascara. The real marketing ploy, however, lies in what W!NK has dubbed "Terpessence." The company has developed a series of flavors of cannabis oils for vaping, adding custom-blended food-grade terpenes to create flavors with catchy monikers like Grapephoria, Bubblewish, Tangibright and Chocominted. The 500-milligram oil cartridges average about 50 to 55 percent THC.

The idea that weed needs to be gussied up so women feel comfortable consuming it is controversial in some circles, but the folks behind W!NK believe there's a large, untapped group of female cannabis consumers who prefer their weed with added fruity, bubblegummy or mint-chocolate notes. And truly, if you like candy, you'll probably enjoy W!NK's line of Willy Wonka-esque oils. This writer was pleasantly surprised by the Chocominted blend—the mellow high and sweet taste made for a very agreeable afternoon. And the pink vape looks cute in my makeup bag. wink-wink.com



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Matt Couto and Jack Donovan show their respect for Elder



Torching Myths and Marijuana

The band Elder cut through the noise to reveal what's real. *By Mark Miller*

Elder albums, like the majestic *Dead Roots Stirring* (2011) and the band's new *Reflections of a Floating World*, aren't merely released—they break free from confinement, like the Amazon emerging as a modest mountain rivulet and becoming a force of unstoppable rushing power. Elder's music mirrors such mighty waters, with wave-crashing chords constructed by guitarist/vocalist Nicholas DiSalvo and embellishments by Jack Donovan on bass with drummer Matt Couto.

Interviewing the band is as rewarding as listening to them, as all three members express strong opinions on every subject, while killing a few myths about stoner rock, the occult and Boston music fans!

When it comes to weed, now legal in their home state of Massachusetts, the band

couldn't be more supportive.

Donovan expresses his approval: "I love Massachusetts finally legalizing recreational use of pot... It was only a matter of time. I'm only bummed legalization took this long!"

Couto is open about his cannabis use: "I usually smoke a bit here and there throughout the day, then an hour or two before we play, I'll start taking it easy." He digs edibles too, "But only ones from pot shops, since I trust those. Everyone has a friend that says they make amazing weed brownies. Then you eat a few and realize your friend doesn't know what he or she is doing!"

Donovan takes it slower: "I used to smoke before a show, but with the new material, I really like to take it easy before playing. Directly after a show, though, I love a nice

spliff—helps me unwind." And he recently caught on to CBD, he says: "I discovered [it] while out in Portland a few months ago, playing Stumpf-fest. A more chill high has its time and place too."

When we broach the subject of Boston music fans, the first of several stereotypes begins to fall. For one, Donovan disputes the notion that Boston is a great music town: "Boston people love their sports way more than music. I break the mold because I love seeing bands, but I can't deny it—I love Boston sports too!"

As far as Elder being the prototypical "stoner rock

"Everyone has a friend that says they make amazing weed brownies. Then you eat a few and realize your friend doesn't know what he or she is doing!"

band" goes, the trio opts to define the categorization on their own terms. While DiSalvo agrees their music is psychedelic, Couto and Donovan don't think the stoner label accurately describes Elder in its entirety.

DiSalvo also swats down the notion that a band like Elder has to feature at least one member who's a spell-casting warlock. "Occult literature never interested me past my teenage fascination with satanic imagery," he avers. "If anything, I'm more interested in an atheistic point of view."

One final myth the band smashes: Even though metal and hard-rock European fans are associated with being sloshed on huge steins of beer, they get stoned too. Sometimes, they even help the band get high! As Couto recalls fondly, "The last time we played in [Germany], we were bored after driving for many hours, and wanted weed. This random guy was walking toward our van, and I asked him if he knew where to get hash, even though Nick and Jack told me it was a bad idea. The guy simply asked how much we wanted, ran around the corner and came back a minute later with a nice chunk of hash for us!" The stoner stars definitely aligned for Elder that night. ✨

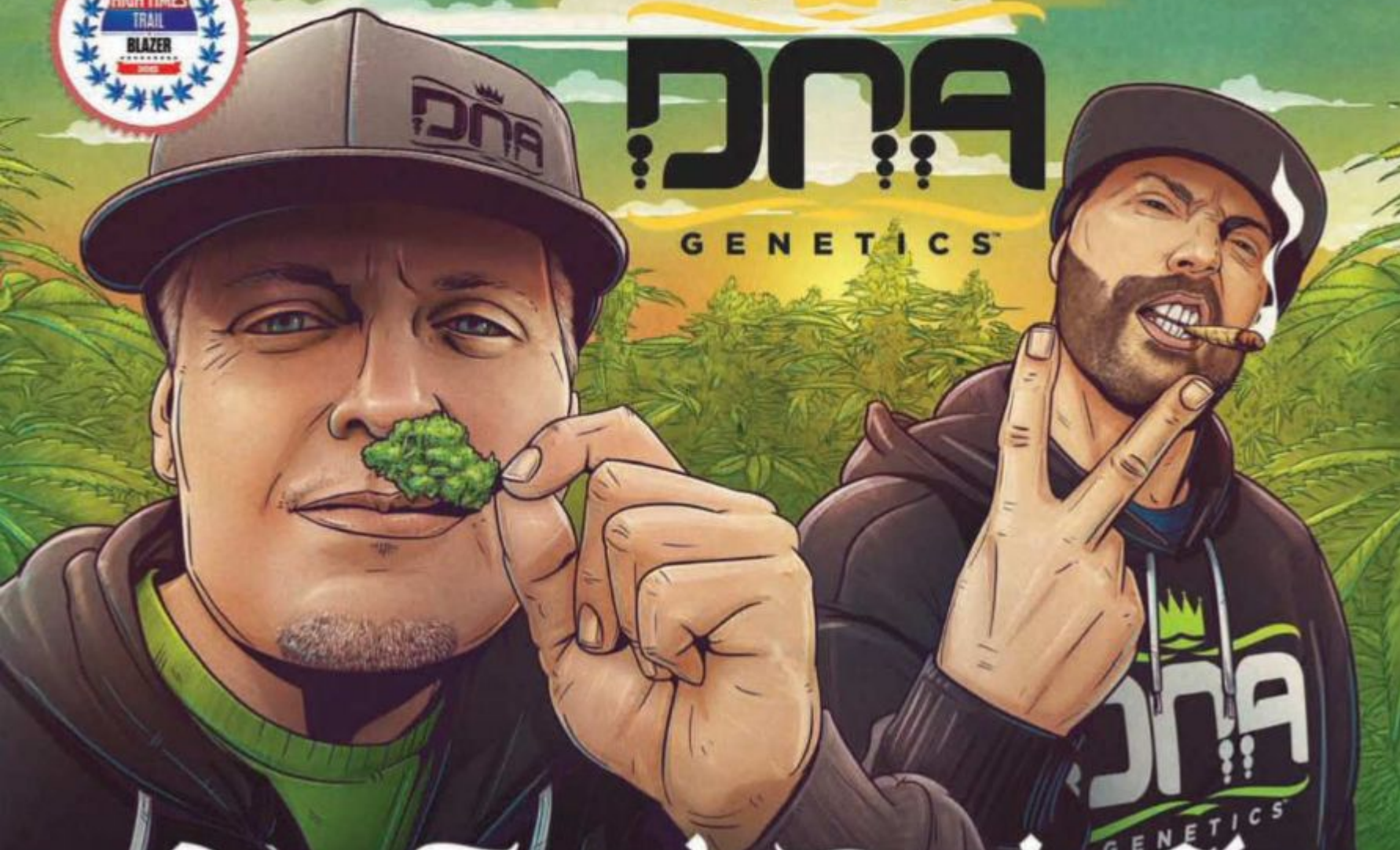


Mass Hype

Elder, officially together since 2007, hail from New Bedford, MA, even though bassist Jack Donovan admits, "It's more recognizable to say we're from Boston!" Good thing for the group that Massachusetts will legalize July 2018.



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Killer Mike and El-P get it right.

Run the Jewels & the Power of Symbolism

Killer Mike and El-P have set the bar high for innovative and explosive hip-hop, and at the same time have forged a genuine friendship that inspires countless fans. *By Kyle Eustice*

Heavy smoke wafts through the air in Run the Jewels's trailer as Killer Mike puffs on a joint. His partner in crime, El-P, is sitting comfortably on the couch after the duo's Maha Music Festival set in Omaha, NE, was cut short due to an impending storm. With the driver of a black Cadillac Escalade patiently waiting to whisk them away, they are still eager to discuss their meteoric rise to fame.

After all, it was only five years ago that Mike asked El-P to produce his 2012 solo album, *R.A.P. Music*, the project that started it all. In 2013, the Georgia native/Outkast affiliate and New York-underground hip-hop legend

officially teamed up under the Run the Jewels moniker—and the rest is history.

"We did not anticipate this," El-P explains. "There's really no way around it. We just didn't—certainly not when we were doing the first Run the Jewels project, 'cause we were just doing it for fun. We didn't think it would become the main thing we were doing. We just didn't have anything lined up. We were just hanging and being creative with each other. We just did it just because we loved making music."

Run the Jewels released its self-titled debut in 2013 to critical acclaim and followed up with *Run the Jewels 2* in

2014 and *Run the Jewels 3* in 2016. Since then, the duo's stock has soared and they've simply been enjoying the wild ride. Mike has always had one goal in mind, and, evidently, his plan is working.

"I'm fucking nuts, so I'll say it, like, 'We're going to take over the fucking world.' We are becoming what we always wanted to become, and that's one of the best rap groups. We wanted to do

"We didn't think it would become the main thing we were doing. We just didn't have anything lined up."

what we saw Outkast, EPMD, the Beasties, 8Ball & MJG, and UGK do—hang out, make dope music with your friends and rock the crowd."

Together, El-P and Killer Mike offer more than just clever rhyme schemes, explosive production and intriguing lyrical content. They're a symbol of what it means to put any perceived differences aside and bust through stereotypes. Considering America's political climate and ever-evolving divisiveness, Run the Jewels's outspokenness couldn't come at a better time.

"We just are friends," Mike explains. "Our friendship inspires people. We aren't mad about it inspiring people, because I would love to see kids in this country overcome these issues. We're given racism, classism and suspicions of one another. We're kind of given that by our parents, aunts and bigger society. I'm happy to see kids coming up using our friendship and saying, 'You know what? We cool.' That's not why we're friends, though. We're just fucking friends."

"The power of the symbolism doesn't escape us, especially in these times, but it's a by-product of a genuine friendship," El-P adds. "This is just the reality of our friendship. This is just the truth." ✨



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"I think people need something genuine. What we have is legitimately genuine for us. The fact that it easily translates is something that you can't sit down in a motherfuckin' marketing meeting and come up with that shit." El-P

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Heaven in '77

Maydays of the Grateful Dead

An oft-leveled criticism against the Grateful Dead is egregious sloppiness: missed cues, off-key vocals, excessive noodling. Even Deadheads will cop to its accuracy, contending that when one takes chances, the chances are greater one will stumble. However, in May 1977, weariness and the wrong drugs had yet to force the band to lose their lean sheen, and they were road-tested tight. Recorded by Betty Cantor-Jackson with crystal clarity, the four nights of music from May 5 through 9 on this 11-CD box set are the Dead at their Zeus-ian zenith.



Grateful Dead
May 1977: Get Shown the Light
Cornell 5/8/77
(Rhino/Grateful Dead)



Cornell '77
Peter Connors
(Cornell University Press)

The songs have stood time's test, and lead guitarist Jerry Garcia lives up to his virtuosic rep: each note luminous, deftly and elegantly strung together, an utterly singular blend of Chuck Berry, Freddie King and Andrés Segovia. The band members are paying keen attention to each other—the secret to the Dead at their finest—creating aural geometric structures through improvisation, thus literally psychedelic. Of the four shows, May 8 at Cornell University is heralded as particularly primo, and hence it's available as separate three-CD and five-LP sets.

The book *Cornell '77: The Music, the Myth, and the Magnificence of the Grateful Dead's Concert at Barton Hall*, by Deadhead Peter Connors, is a smart history of those storied nights. It's also a lot of fun. One amusing anecdote of a prank by Cornell students also points to the kindness of the Dead community. And in his exegesis of the Dead classic "Dark Star," Connors's own writing becomes psychedelic—a challenge for any scribe, and one he meets with a poet's lyricism and insider's experience. *Michael Simmons*

MUSIC RECOMMENDATIONS



Burial
Subtemple
(Hyperdub)

More sonic tapestry than music, *Subtemple* enters uncharted territory for the elusive UK electronic musician William Bevan, a.k.a. Burial. A 17-minute dirge fueled by otherworldly howling and digital trumpets echoing doom, this deeply textured EP plays like a full-length album and grows

richer with every spin. Burial eschews his characteristic clanky beats and infectious rhythms for symphonic ambient pulses and multilayered digital orchestrations. The engrossing result is a truly avant-garde release exclaiming that this artist hears melodies the world has yet to comprehend. *Tommy Smith*



Gogol Bordello
Seekers and Finders
(Cooking Vinyl)

If Gogol Bordello were a strain, it would be a dynamic *sativa*: unique, energetic and just go, go, go! The newest album by the infamous gypsy punks features introspective lyrics, like on "Break Into Your Higher Self" and the title track, featuring the inimitable Regina Spektor.

Bandleader Eugene Hütz is constantly creating while the band tours; *Seekers and Finders* was developed on the road, with Hütz's inspirations and the band's creative input. Their signature sound is solid on this seventh studio album, ideal for bopping happily about or revving up a house party! *Mary Ought Six*



Cloakroom
Time Well
(Relapse)

Enthusiasts of '90s alt-rock will find a treasure trove of familiar delights on Cloakroom's second album. The Indiana trio weaves misty shoegaze ambience with the loud/quiet/loud guitar scheme so deftly employed by indie darlings Slint and the Pixies. Sprinkle in a little Slowdive, maybe

a pinch of My Bloody Valentine, and it's 1991 all over again. But with songs that average about six or seven minutes apiece, Cloakroom take their time going back in time. Tracks are driven Sunday-style by vocalist-guitarist Doyle Martin, resulting in leisurely, dream-like meditations. *J. Bennett*



Lukas Nelson & Promise of the Real
Lukas Nelson & Promise of the Real
(Fantasy)

As technology continues its war against flesh and blood, the promise of the real remains elusive. Singer/songwriter/guitarist Lukas Nelson and his band deliver. Nelson's piercing Appalachian tenor has perfect vibrato, and his guitar picking is marked by taut, elegant clusters frosted with

sweet harmonics. (Nelson and his band have accompanied his father Willie, and Neil Young.) Like his dad, Nelson's a master of wrist-slashing balladry. We dig the metallic rocker "High Times," which satirizes the unreal promises of politicians. Nelson demands "the right to smoke!" *Michael Simmons*



Kesha
Rainbow
(Kemosabe)

Kesha is the In-N-Out Burger of female pop stars—well-made and exceptional in an undefinably generic way, and you don't want too much of it. Though much of *Rainbow* is devoted to thinly veiled allusions to Dr. Luke touching her butt, Kesha impressively splits genres through her new

album, her twangy vocals explicating the hardships of being an impossibly rich white girl in America. I heard the entirety of *Rainbow* at half-volume in one earbud while shopping at Safeway—the recommended (and seemingly intended) way to listen to this consumable pop-art product. *Tommy Smith*

A NEW STRAIN EMERGES...

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Is California King?

What to watch for in 2018 as the Golden State officially enters the legal marijuana market.

Beau Whitney is Senior Economist for New Frontier Data



AS THE CALENDAR turns to 2018, all eyes will be on California. With its adult-use market opening statewide on January 1, the Golden State's green rush for cannabis-market riches and tax revenues looks to open with a boom heard across the nation and within the halls of Congress in Washington, DC. Throughout the new year, the trends which take hold in California will influence the industry at large and give insights to the foreseeable future, including:

Deployment of New Legal Markets

California's GDP, taken by itself, would represent the sixth-largest economy among all world nations. Given that fact, the state immediately represents the biggest and broadest cannabis market, setting the tone and public perceptions for all of the other new legal markets opening in 2018.

There is a significant potential for the expansion of e-commerce and delivery services in the state, where the number of nonmedical cannabis consumers far exceeds that of medical patients. As the adult-use market is rolled out, the opportunities for dispensaries and retail operations to reach customers through an on-demand marketplace with delivery services will only grow. In the meantime, as new markets also open in Michigan, Ohio, Maryland and other states, each success will lead to more pressure locally—and greater momentum nationally—for the federal government to reform current policy and laws.

States' Rights Versus the Federal Government

Any practical advancement of the past year's continual and rhetorical tug-of-war between US Attorney General Jeff Sessions's prohibitionist stance and states with legalized, regulated and taxed programs will move closer to brinksmanship in the courts. In light of the recent push-back by the states of Washington, Colorado, Alaska and Oregon to Sessions's assessment of the effectiveness of their



respective regulatory programs, how the federal government moves against either medical or adult-use cannabis markets will be challenged in the courts, and will likely be resolved ultimately by reconsideration of the federal status of marijuana as a Schedule I drug.

Banking and Taxation

Will banking and tax reform occur in 2018? Several measures are being devised and proposed to allow for more standardized financial transactions. To the extent that they are adopted and enacted, the industry should expect to see substantial increases in mainstream interest and investment.

Questions and concerns are being raised in financial markets and institutions about the international effects from Canada (with nationwide adult use becoming legal in July 2018), Mexico, South America and the European Union as they all lurch forward while the United States continues to mull over a national policy.

Craft Versus Commercial: An Evolution in National Branding

As legalization is expected to take hold in more and more states across the country, how well will small craft producers hold their own against big players stepping into the market through mergers and acquisitions? How will major corporate splashes create displacement, as the beer

industry has seen? Will there be room for both craft and commercial producers to profitably coexist? The question of how states anticipate and incorporate competitive balance will define the market. As the overall market continues to play out before trending toward consolidation, branding and operational execution will become key differentiators toward success or failure among

retailers for both products and services.

Market growth will be fueled not only by increased consumer demand, but also by the introduction of new brands and product types aimed at attracting new cannabis consumers, particularly those who prefer not to ingest cannabis in smoked form. As New Frontier Data's analysis has already shown, there has been a dramatic shift in consumer interest in non-flower products, specifically disposable vaporizers, concentrates and edibles.

As another component of such market dynamics, pricing commoditization will be key, particularly how quickly and to what extent prices fall. The answer to that will profoundly affect the market plans of thousands of companies and determine their fortunes and fates.

Efficacy Studies on Medical Cannabis

In order to address the national opioid crisis, a sharper focus will be applied toward medical cannabis and its effects on the human body. As the research is gathered, this focus will shift from how the chemistry works to cannabis's effectiveness and performance as a treatment, and then to its short- and long-term effects on brains and bodies.

If 2016 was considered an industry watershed for eight new states having adopted legalization programs, 2018 looks to provide a quantum leap forward, led primarily by the state of California. 🌿

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Thank you, High Times. Congratulations on your 500th issue!



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 -Burlington, VT

MARKET ANALYSIS

Prices by the ounce

Kush kicked off the new year as the dominant strain, accounting for over ten percent of all January THMQ entries. The US Price Index held steady in January, while the Southern Index dropped \$7 from its previous month's average. Out West, the price of pot was up \$9 from its December average, while the Eastern Index held steady, closing January \$1 above its previous month's average.

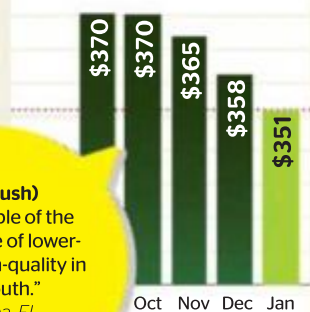
US Price Index
 YTD Average: \$321



Eastern Index
 YTD Average: \$346



Southern Index
 YTD Average: \$351



Western Index
 YTD Average: \$267



(OG Kush)
 "An example of the prevalence of lower-priced, high-quality in the South."
 -Tampa, FL

TRANS HIGH MARKET QUOTATIONS

STATE	CITY	STRAIN	PRICE
ALABAMA	Montgomery	Girl Scout Cookies	\$450
ALASKA	Anchorage	CBDB	400
ARIZONA	Phoenix Tucson	Pineapple Trainwreck Gorilla Glue #4	185 260
ARKANSAS	Fort Smith	White Widow	320
CALIFORNIA	Arcata San Diego	Gorilla Glue #4 Super Lemon Haze	320 232
COLORADO	Denver	Golden Goat	225
CONNECTICUT	Hartford	Blue Diesel	336
FLORIDA	Boca Raton Tampa	Girl Scout Cookies OG Kush	280 300
GEORGIA	Athens Statesboro	OG Kush Mango Kush	280 280
ILLINOIS	Moline	Ace of Spades	400
LOUISIANA	Baton Rouge	Cherry Diesel	280
MARYLAND	Hagerstown	Candy Cane Kush	250
MASSACHUSETTS	New Bedford	OG Cherry	280
MICHIGAN	Detroit	White Widow	360
MINNESOTA	Rochester	Headband	260
MISSOURI	Jackson Kirksville	Gorilla Glue White Widow	450 260
MONTANA	Bozeman Missoula	Super Lemon Haze Girl Scout Cookies	175 225
NEBRASKA	Norfolk	Jack Frost	280
NEVADA	Laughlin Las Vegas	Cobain Kush Don Draper	360 284
NEW HAMPSHIRE	Dover	Green Crack	240
NEW MEXICO	Albuquerque	Juicy Fruit	308
NEW YORK	Oswego Yonkers	OG Kush Bubba Kush	450 320
NORTH CAROLINA	Gastonia Greensboro	Bubble Gum Kush Gas	450 420
OHIO	Cleveland	Lemon Kush	360
OREGON	Eugene Medford	Mendo Breath White Rhino	240 160
PENNSYLVANIA	Scranton State College	Grand Daddy Purple Green Crack	450 320
RHODE ISLAND	Warwick	Critical Jack	250
TEXAS	Houston	OG Kush	450
UTAH	Washington City	OG Kush	400
VERMONT	Burlington	Snow Drop	375
VIRGINIA	Newport News	Blackberry Kush	450
WASHINGTON	Pullman Seattle	Super Silver Haze Space Wrangler	210 260
WISCONSIN	Milwaukee	Blue Dream	280
INTERNATIONAL			
AUSTRALIA	Mildura	White Widow	A\$400
CANADA	Toronto Vancouver	Sour Diesel God Bud	C\$265 280
UNITED KINGDOM	London	Skunk	£260

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Ideal Atmos

How to Dial In Your Atmosphere for Home Gardens. *Story & photos by Nico Escondido*

Whether you are growing at home in a converted bedroom or basement, a closet or a small grow tent, the need for optimal atmospheric conditions in your garden is just as important as it is for professional commercial growers in large warehouses or greenhouses. Plants need to have specific conditions met in order to grow and develop into healthy plants, leading to bigger yields, higher potency and better flavor in your cannabis.

Fortunately, home gardens are typically smaller and therefore easier to manage and less expensive to dial in. Still, good horticultural technique and a solid understanding of plant science and physiology is essential for a productive garden. Here we break down both the basics as well as the more advanced concepts in good garden practices in order to maximize genetic potential.

phere



The Basics



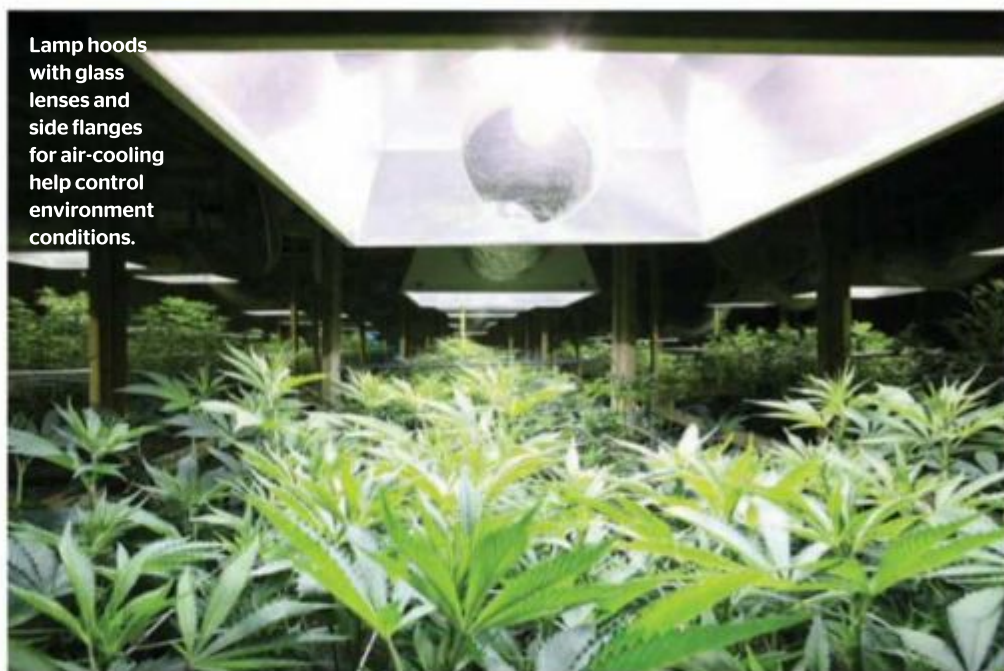
Garden lighting affects atmospheric conditions such as temperatures, humidity and CO₂.

Lighting

It may seem contrary to our expectations of “atmosphere,” as lighting is not as palpable as temperature or humidity, but all environmental conditions within the garden begin with lighting. Light provides energy for the plants to perform photosynthesis, but it also provides an unwanted by-product in the form of heat. Heat, in turn, can affect humidity, carbon-dioxide uptake (or plant respiration), and the temperatures of the garden’s air, water and grow medium. It is for these reasons that growers are always searching for the strongest light source with the least heat emission and smallest power draw.

For small indoor gardens, there are many more options than there are for large-format grow operations. It is still recommended that home growers utilize high-intensity discharge (HID) lamps such as metal-halide (MH) and high-pressure sodium (HPS) bulbs; however, various choices in wattage are available depending on the size of your garden. Whereas commercial growers usually stick to the 1,000-watt setups, home growers can go as low as 250 watts, with most settling on 400- or 600-watt lamps.

For nurseries with seedlings or baby clones, fluorescent lamps offer great spectrum and little heat, though fluorescents usually aren’t deployed for mature plants in the vegetative or flowering cycles. It’s better to



Lamp hoods with glass lenses and side flanges for air-cooling help control environment conditions.

utilize MH and HPS bulbs for those situations, respectively. LEDs have offered home growers a new alternative for these phases, but the earlier models lacked in both light quality and quantity. Today, there are stronger LED lamps with broader spectrums, but with the increase in light quality comes an increase in price, power consumption and heat by-product, giving HID lamps an advantage over LEDs.

The key to any good lighting setup is to

find an effective way to remove the heat created by the lamps so that the garden receives only the light and none of the heat. For small gardens, HID lamps with glass lenses and flanges on the sides of the hoods for attaching ductwork are a great solution. Air-cooled lamps, which blow air over the bulbs (using an inline fan) and push the heat out of the garden space, are popular and useful for mitigating heat from lighting (more on this below).



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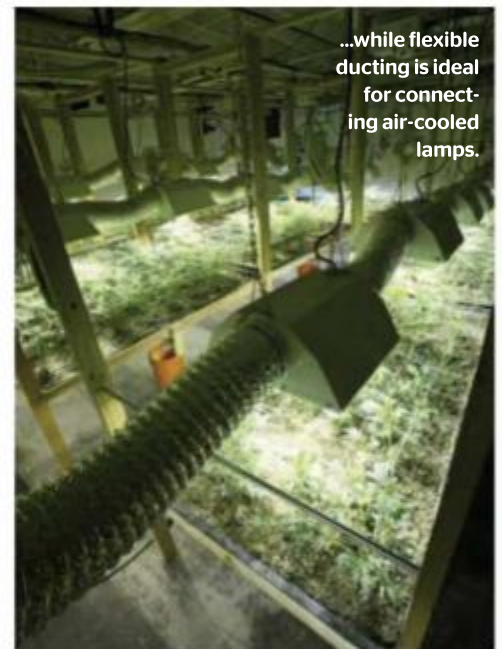


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Rigid ductwork is best for AC and air circulation...



...while flexible ducting is ideal for connecting air-cooled lamps.

Ventilation and Circulation

Aside from using air-cooled lamps, proper ventilation and exhaust can go a long way in cooling your garden space to the necessary temperatures. As a general rule, when ventilating an indoor garden, growers want to pull fresh, cooler outside air in from a low place in the room and push warmer garden air out from a high point in the room. Remember, heat rises, so the air near the floor is always much cooler than the air accumulating near the ceiling and around the lights.

Flexible ducting can be hung around the ceiling and lights with an inline fan attached to suck heat from the garden and blow it out through the ceiling, walls or windows. Inline or floor-model fans can be used to pull fresh air into the garden. If you are blowing air from your garden directly outdoors, or pulling in fresh air from outside your home, you may want to consider attaching charcoal filters to your ductwork and inline fans to scrub the exhaust of any odors and the intake of bacteria, bugs and mold. Similarly, for security reasons, be sure that any equipment attached

to or near windows is properly concealed so as not to draw attention from those outside.

Just as important as ventilation is general air circulation within the garden. Oscillating fans on the walls provide an excellent way to keep air moving over the plants, which aids in respiration and helps prevent mold and mildew from forming on leaves, walls and tables. Furthermore, good air circulation is key in preventing heat pockets from forming around lamps and under the plant canopy. Circulation can greatly reduce high garden temperatures and aid in good garden exhaust and air exchange.

Temperature

Temperature is a relative term in the grow-room, as there are ideal temperatures for various aspects of the garden. Air temperature, reservoir (water) temperature and medium/root-zone temperature all play important roles in the success of your garden.

Air temperature is the single most important environmental factor for any indoor garden. Not only does garden temperature affect humidity levels and the growth of molds and powdery mildew, it also regulates plant respiration. Optimal garden temperatures range between 68°F and 76°F, and while cannabis plants can survive in temperatures of up to 100°F, once the garden reaches 85°F the leaf stomata begin to close, respiration rates drop and photosynthesis slows down exponentially with each additional degree.

When plants close their stomata in high heat to conserve water transpiration, the plant respire (breathes) heavily in an attempt to keep leaves cool and pumped up with carbon dioxide and water. This heavy respiration results in airy flowers and low yields if the high temperature trends continue for prolonged periods of time during the flowering stage.

Root-zone temperature is not as hard to manage as air temperature, but it is also important to monitor. As a general rule, roots function better in warmer temperatures that remain constant and do not fluctuate. Ideally, grow-medium temperatures should be kept around 76°F (which can be a challenge since we often keep water chilled). However, this may vary depending on the age of your plants. For example, young seedlings or cuttings developing new root structures will usually do better with warmer grow-medium temperatures of around 80°F, especially during the dark cycle when the green parts of the plant are not being pressured by light to send excess sugars down to the roots for storage.

As for water temperature for irrigation, many growers like to keep reservoirs out of the growroom, away from light and heat. In fact, many commercial growers use chillers in their reservoirs to keep water cold, ideally around 68°F to 70°F. The colder the water, the more oxygen it can hold—not to mention the harder it is for pathogens, bacteria and algae to grow and survive.



Oscillating fans near or above lights help prevent heat build-up.



Place several temp and humidity monitors around the garden.



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Supplemental CO₂

Carbon dioxide (CO₂) is vital for all plants. Leaves absorb CO₂ and strip the carbon molecule for use in photosynthesis. However, it is important to note that CO₂ is only necessary for plants during the day (light) cycle, when photosynthesis is ongoing. And the more light available to a plant, the more CO₂ it needs for photosynthetic processes. Ambient CO₂ levels in nature range from about 300 to 400 ppm and may climb to around 500 ppm in cities. Assuming an average of 3,000 lumens per square foot of canopy, boosting CO₂ to 1,400 to 1,600 ppm can add 25 to 50 percent more yield at harvest time.

Air circulation comes into play again in the grow-room, where a smaller amount of CO₂ is available. Moving air through the plants and over their leaves greatly aids in CO₂ intake. Remember, in nature there is often at least some breeze to help move air and CO₂ around plants, but indoor air can become stale and unmoving, making it difficult for plants to get the needed CO₂ for photosynthesis. Mounting fans lower on growroom walls—at around 4 feet—will help air penetrate the plants and move throughout the garden.

Several options exist for creating additional CO₂ within an indoor garden. For larger gardens and greenhouses, gas (propane) burners can be purchased and hung from ceilings (though it should be noted these units produce excess heat and moisture that can cause humidity spikes). For smaller gardens, CO₂ tanks and CO₂ boost buckets are excellent options. All of these products should be attached to diffusers/regulators that work in conjunction with atmospheric timers and controllers. These controllers will ensure that the CO₂ units only run when the room ventilation systems are off and that CO₂ is emitted only during the light cycle.

O₂

An often-overlooked aspect of indoor growing is oxygen (O₂). Although we are used to hearing that CO₂ is essential to a plant's lifeblood, we often forget the importance of oxygen for the roots. While the leaves breathe in CO₂, the roots breathe in O₂. The more O₂ the roots have available to them, the more stored energy the root system can transport to the green plant aboveground to aid in photosynthesis during the day. During the night cycle, the roots grow and store excess sugars.

A plant can only grow as well as the root structure will allow, and a lack of oxygen in the root zone will inhibit root respiration and slow photosynthesis during the daytime. This is why plant scientists often state that both the size of the mature plant and the amount of its yield are directly proportional to the growth of the root structure. Many home growers will use air pumps or air stones in their reservoirs to help aerate the water, but it's even better to aerate the medium directly by using loose, non-compacting grow mediums such as light pro-mix (with amendments such as twigs and pebbles) or HEC (hardened-expanded clay) in hydroponic systems. This is also why aeroponic systems are a popular choice for advanced growers both at home and commercially.

Gas burners are an effective way to increase CO₂.



Air stones oxygenate this reservoir.

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Humidity

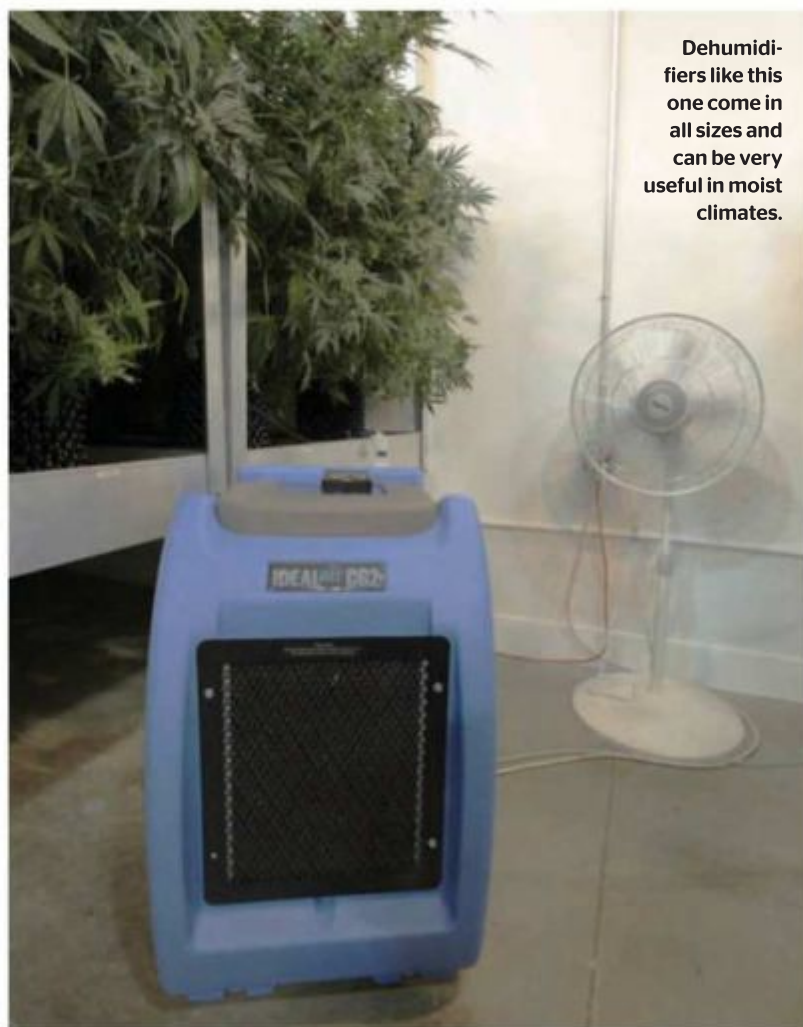
Many growers view humidity as a problem, but the truth is that some humidity is actually good for the plants. Growroom humidity levels of between 40 to 60 percent are perfectly acceptable and even comfortable for cannabis plants. Advanced growers usually settle their spaces between 45 to 55 percent humidity. Anything lower than 30 percent and CO₂ levels in the air will start to decrease—as will light absorption—thereby slowing growth.

However, when levels start to climb above 65 percent, a new set of problems can arise, such as the growth of botrytis (brown mold) and powdery mildew on plants, walls and trays, as well as airborne pathogens and bacteria around the growroom.

It is important to also remember that both air temperature and moisture in the air contribute to a garden's humidity. As temperatures drop, humidity levels rise. It's a delicate balancing act, but big swings in temperature within a garden can severely affect the humidity as leaves open and close their stomata. With high temperatures, stomata that open too much allow excessive moisture to escape and raise humidity, but stomata that don't open enough inhibit CO₂ absorption.

If temperatures drop in a garden during the dark cycle by more than 12 to 14 degrees, humidity may climb beyond optimal levels. If condensation sets in, there are big problems brewing. To reduce humidity levels in the growroom, growers can raise garden temperatures slightly, reduce water sources in the room and/or continually introduce fresh, drier air into the space.

In a nursery, however, young seedlings and clones actually do better with higher levels of humidity. Using a humidor tray and dome helps keep young plants at humidity levels of around 70 percent, which significantly boosts the rooting process.



Dehumidifiers like this one come in all sizes and can be very useful in moist climates.

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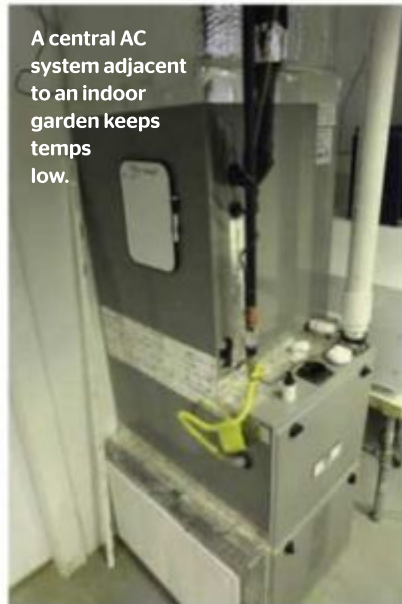
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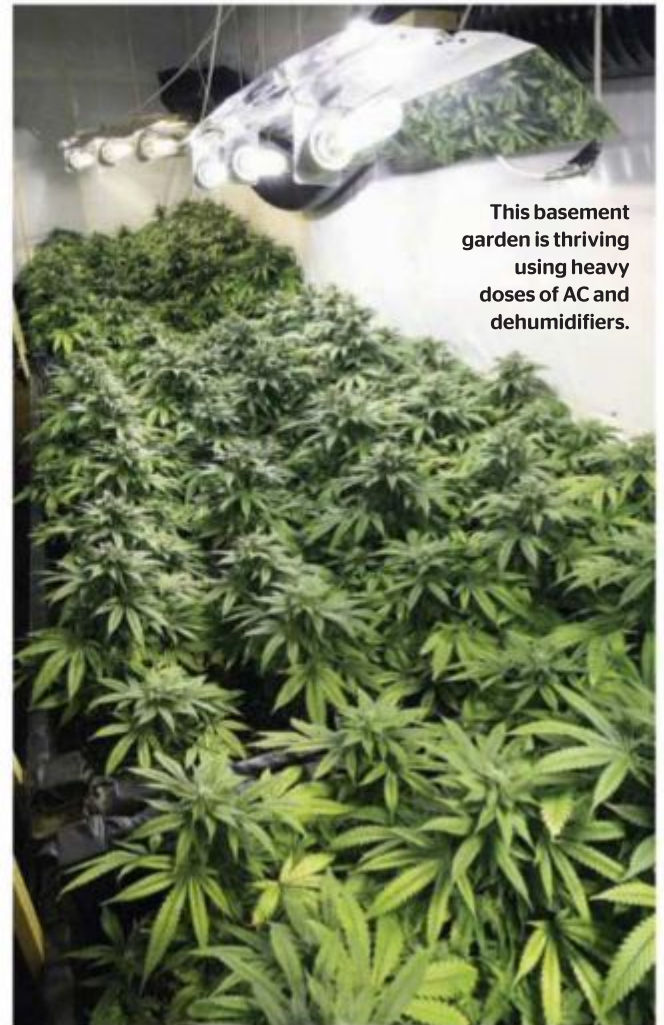
A central AC system adjacent to an indoor garden keeps temps low.

AC

Air-conditioning is a luxury in most indoor gardens, but it can help alleviate various burdens on your garden if implemented properly. Obviously, AC units, whether they are central HVAC or even smaller window units, help control garden temperatures. Using a thermostat controller will aid growers in maintaining set temperatures throughout the day. Integrated controllers can also work in conjunction with exhaust fans, lights and CO₂ units to ensure that gardens receive the correct elements of each without interference—you wouldn't want the AC on at the same time you are venting the room, for example.

An alternative to cooling a garden using AC might be by utilizing air-cooled lamps to mitigate their heat by-product. Since grow lights are the main culprit when it comes to rising growroom temperatures, many home growers opt to use lamps with hoods, glass lenses and side flanges for attaching flexible ductwork. They then use an inline fan to either suck or blow the hot air created by bulbs directly up and out of the growroom. This solution, while a bit more work, is efficient and helps save on the energy costs of running AC units.

Remember, temperature and humidity are closely related, and you don't want to drop temperatures only to find humidity rising out of control. Like everything in the garden, it becomes a delicate balancing act that requires growers to keep an eye on all garden stats until the growroom is fully dialed-in. But once you get there, both you and your plants will be a lot happier for the environment you created. ✨



This basement garden is thriving using heavy doses of AC and dehumidifiers.

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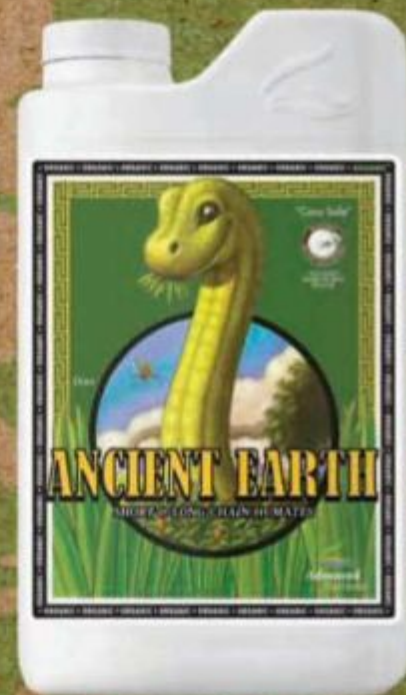


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Insane Clown Posse address the frenzied crowd in Washington, DC.

Juggalos Vs. The FBI

When the Juggalos invaded the nation's capital to protest a 2011 FBI report designating Insane Clown Posse's fan base as a gang, no one knew exactly what to expect. *By Nathan Rabin*

Juggalos gather in the National Mall.



The Juggalo March on Washington was announced over a year ago during Insane Clown Posse’s notorious annual festival, the Gathering of the Juggalos. ICP’s ardent followers, known as Juggalos, are among the world’s most passionate and ridiculed fan bases, and the idea of marching on Washington to fight for civil rights, while admirable, didn’t fit with most people’s preconception of the group. However, the march to protest the FBI’s designation of the Juggalos as a “loosely organized hybrid gang” proved irresistible to an online world that has long viewed Insane Clown Posse with equal parts disdain and fascination.

It was a bold move for ICP. A pair of high-school dropouts known as Shaggy 2 Dope and Violent J—who are notorious for dressing up like psychotic clowns for wild, haunted-house-style shows—were making an unlikely move into the political arena. Of course, at the same time, the duo professes to be fundamentally apolitical and concerned solely with protecting the rights of their fans and their ability to sell merchandise at Hot Topic, both of which were impacted by

the FBI’s outlandish “gang” designation.

ICP appeared concerned about alienating their fans by pushing the march too hard. In fact, promotion for the demonstration was conspicuously absent during this year’s Gathering of the Juggalos, and some fans began to wonder whether it would really go down. Then, over the summer, the detestable cartoon villains of the alt-right announced they were going to hold the “Mother of All Rallies” (MOAR) the same day as the Juggalo March on Washington—and in the same location.

Suddenly, Insane Clown Posse—an ostensibly apolitical group whose music and ideology are nevertheless intensely class-conscious, anti-racist, anti-redneck and anti-Confederate-flag, and rooted in a surprisingly heavy-handed, unmistakable Judeo-Christian sense of morality—were no longer fighting an abstraction like injustice and government overreach. Now it appeared they’d be taking on neo-Nazis in a skirmish.

Once the MOAR was announced, something unexpected happened: The straight world started rooting for the Juggalos. Organizations like the Democratic Socialists of America were

throwing their support behind a group with a legitimate claim to being the “Most Hated Band in the Land.” The International Workers of the World released an official statement articulating their solidarity with their Juggalo brothers and sisters.

The march was specifically focused on attempting to remove the Juggalos from a list of known gangs that includes groups like the Bloods and the Crips. But it was also about changing the narrative. It was about ending the stereotype of Juggalos as violent, mean, poor, uneducated and amoral cretins, replacing it with a more empathetic portrait of a working-class community of ostracized outsiders who love and support each other and struggle mightily to be a force for good.

As someone who has written two sympathetic books about Insane Clown Posse, as well as countless articles, I’ve spent much of the past five years trying to change the way Juggalos are perceived. It was an unexpected honor when I was asked to speak at the march. This was an opportunity to be a part of pop-culture history, not just an observer of it. The prospect of standing in the



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shadows of some of our nation's most important and sacred monuments and addressing an army of Juggalos was unbelievably intimidating, so of course I said yes.

In the weeks and months leading up to the rally, I had no idea what to expect. I certainly never envisioned that part of the most important day in Juggalo and Insane Clown Posse history would involve me standing behind a podium festooned with the Psychopathic Records Hatchet Man logo in front of the Lincoln Memorial while delivering a very loud, very short and very aggressive speech about what it means to be a Juggalo in a political, social and economic sense.

world they aren't monsters. They had to demonstrate to the world what they really are—loving, community-minded, anti-racist, anti-police-brutality, anti-homophobia and anti-persecution.

The evening kicked off with a series of earnest speeches from Juggalos whose lives had been negatively affected by the FBI's gang designation. They'd lost jobs, lost custody of their children and paid a horrific personal price for the Hatchet Man tattoos on their arms or the Psychopathic Records bumper stickers on their cars, both of which law-enforcement officers are encouraged to view as gang symbols.

Juggalos are not known for their

free-associative Juggalo word jazz, and over the course of a half hour the duo produced some of the silliest rhetoric ever to be expressed by official speakers at the Lincoln Memorial. For example, Shaggy 2 Dope didn't just speak out against discrimination, he spoke out against "Played-out, nineteen-sixty-fucking-four, old-guard, old-money, old wiggly whiskey-throat redneck bigot, bitch-boy richie-dick head-douchery discrimination."

Not to be outdone, Violent J opened up by explaining that he is known, to different people and for different reasons, as "Joseph Frank Bruce Lee," "Duke of the Wicked," "Dead Body Man," "Mr. Happy," "Bullet," "Florida Joe," "Big Baby Sweets," "Big Baby Chips," "Max Pepper," "Chef Jeff Joe Swanson," "Dr. Punch," "Unc," "Dad," "J," "Jay," "Violent," "Mr. Diamond," "Dope Jelly" and "Moonglorious."

Truly, Violent J contains multitudes.

It was easily the most important speech of ICP's career and it began, and continued, on a note of unabashed silliness, with bizarre comic digressions and absurdist riffs about government surveillance, Atari 2600 controls and one-hit wonder Psy of "Gangnam Style" fame. When Shaggy 2 Dope lost his place while looking at his speech on a laptop, the crowd, many of whom had made tremendous sacrifices to support each other and ICP, started joyously chanting, "You fucked up! You fucked up!" It's a chant you hear often at Gatherings, and it epitomizes the Juggalo world's cathartic and empowering celebration of screwing up and being human.

Violent J had what was undoubtedly the catchphrase of the rally, enthusiastically shouting, "We're the good guys here! We're actually in the right this time!" It seemed to almost take him by surprise. Certainly, it's an unexpected position for a duo that has reveled in playing the bad guys over the years.

Violent J talked about how he would happily march in favor of gay marriage and freedoms of all kind. He talked about dignity and how the whole Juggalo movement was motivated by love and not hate, but everything eventually came back to giggling about buttocks. For Insane Clown Posse and the Juggalos, the scatological, spiritual, political and emotional are inextricably intertwined. Even in the shadow of the fucking Lincoln Memorial, Insane Clown Posse could not refrain from behaving like middle schoolers.



Shaggy 2 Dope and Violent J

I can only imagine what the tourists on the National Mall that day must have made of the invasion of protesters wearing clown makeup and Psychopathic Records T-shirts and jerseys showing off their elaborate Insane Clown Posse tattoos and wild hairstyles.

There was an incongruously wholesome element to the whole affair. Juggalo children and dogs were a common sight, and—unlike as was the case during the "Drug Bridge" era of the Gathering of the Juggalos (when one of the festival's signature features was an open-air drug bazaar)—it didn't seem troublingly inappropriate for them to be there.

For the march to be effective, Juggalos had to be on their best behavior. It wasn't enough simply to tell the

patience, nor their appetite for earnest rhetoric. Yet for hours they stood in the heat and humidity listening to speeches from people like Solana Patterson-Ramos, an activist from Milwaukee who offered her perspective as a Juggalo as well as a black, Hispanic, pansexual, cosplaying Beyoncé fan and all-purpose geek. Her mere appearance at the march contradicted a lot of lazy assumptions people make about Juggalos, as did the regular affirmations of gay and trans rights and support for gay marriage.

The climax of the event was, of course, ICP's riotous address to their fans and the assembled media. Violent J and Shaggy 2 Dope were onstage both with their Juggalo family and their children.

Their speech began on a note of crazy,

Shaggy 2 Dope and Violent J's address whipped the audience into a frenzy, but the march that followed was defined not by rowdiness but, rather, by an unexpected mellow civility. As the marchers circled the National Mall, they were surrounded on every side by police, tourists and professional photographers. They may have been protesting law enforcement's overreach, but the vibe was chill toward the cops who were keeping an eye on them.

The gaudy spectacle of an Insane Clown Posse event is irresistible to the press and the public at large. Walking with the rest of the marchers, I was

be filled with a terrible, almost parodic urgency, like a Ramones song or an address by an expectorating World War II-era fascist dictator. If I could be comprehensible and/or eloquent, that would be wonderful, but, really, I just wanted to waste as little of everybody's time as humanly possible.

To that end, I delivered a five-minute speech in about two and a half minutes. This gave my feverish rhetoric the weird staccato rhythms of a painfully self-conscious teenager entering his first poetry slam. For two and a half minutes, the Juggalo March on Washington became Psychopathic Records' Wicked Juggalo

Armageddon" (the much-loved ending of ICP's shows, where Juggalos and VIPs and freaks in Halloween masks invade the stage and join ICP in bathing the crowd in Faygo soda showers), I was overjoyed to be part of the craziness until the ground beneath us started to shake and a woman yelled, "Everyone get off! Get off!" Whatever the modest, rickety stage's maximum occupancy, we had undeniably exceeded it, though thankfully people fled the stage before it collapsed under our combined weight.

That ended up being the only dangerous moment of the march. The world may have been hoping for an altercation between Juggalos and the deplorables of the alt-right, fiending for some clown-on-fascist violence. After all, if society is going to continue to devolve into a crazed backyard wrestling match, it might as well be an entertaining one.

Yet a head-to-head skirmish never happened. The alt-right demonstration never affected the march in any real way. The MOAR was supposed to illustrate the strength of the ultra-right community. Instead, it illustrated its weakness.

But if there was no a physical conflict between the Juggalos and the alt-right, there was a larger, more indirect battle for the hearts and minds of the American public. On that level, the Juggalos whooped the alt-right's stale ass something fierce. Despite a series of glitches, and a fair number of no-shows, the Juggalo March on Washington was a seminal moment in ICP's history.

People will continue to think of Insane Clown Posse and their fans as freaks who dress up in clown makeup and get weird tattoos and fetishize both drinking cheap soda and getting sprayed with it in some bizarre carbonated benediction. They'll still be known as a popular favorite for the worst and most hated group in the world. But they'll also be known for mobilizing their uniquely devoted, uniquely maligned fan base to peacefully march for their rights, and the rights of others, in a place that is sacred to American democracy.

In the months leading up to the march, I was worried that ICP's big day would be ruined by Juggalos doing Juggalo shit: getting sloppy drunk, publicly abusing various substances, starting fights and making a giant, messy spectacle of themselves. Instead, the day was saved by Juggalos doing Juggalo shit—loving each other, supporting each other and coming together for a cause greater than themselves. ✨



Speakers took the stage between the Lincoln Memorial and the Reflecting Pool.

probably photographed more in an hour than I had been in the previous 41 years altogether. The whole world might not have been watching, but a large percentage of the American press was, and the Juggalos shocked a lot of people that day by proving that they could march peacefully and without incident.

I was scheduled to be the first speaker after the speeches and performances resumed post-march, which meant that I would have essentially been following Violent J and Shaggy 2 Dope (and the march itself).

Things did not go as scheduled, of course, so I ended up going on after a few more musical acts, but I was still a bundle of nerves. I had a very specific set of goals: I wanted to be loud, I wanted to be fast and I wanted my speech to

Poetry Slam as I yell-shouted my testimony at a deafening volume.

When I concluded with a hearty "Whoop, whoop," I raced offstage before anyone from Psychopathic Records could realize what a mistake they'd made in inviting me.

The world of Insane Clown Posse and the Juggalos is so ramshackle and duct-taped-together that it always feels like a minor miracle when they manage to pull off ambitious events. It always feels like everything could fall apart at any minute, yet it somehow holds together. It's enough to make you believe in miracles.

And at the march, the feeling that everything could fall apart was literal as well as figurative.

Onstage at the end of Insane Clown Posse's set for my very first "Faygo

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Inside softfresh farms

The state of Oregon boasts some incredible cannabis farms that are at the forefront of growing organic craft-quality flowers. Our Pacific Northwest cultivation correspondent reports on one such facility producing perfectly pristine pot. *Story & Photos by StinkBud*





Oregon tokers are spoiled. It's not an exaggeration to say that you can't even give away shitty weed here. Bud that would trip everyone's trigger in another state doesn't even disarm the safety here. And sofresh farms' products, with buds as dank as they get, are miles ahead of those of the state's average grower. The farm has the best genetics, and its growers know how to maximize each strain's potential. If you want the best pot products on the market, sofresh is the call. So sit back, roll a joint and come along on a trip through an award-winning Oregon farm.

Driving up to sofresh farms is a little underwhelming. A large fence keeps the premises out of sight from prying eyes. Once inside, though, it looks like a standard farm, not unlike one you'd expect to see elsewhere in rural America. But, of course, the cultivated plants here are anything but average. The man behind the grow is Tyson Haworth, whose bond with the plants he cares for is palpable. Haworth's passion for growing is infectious, and everyone around him feeds off his enthusiasm. It's hard not to get caught up in his passion when he talks about growing cannabis, and his products are considered by many to be the best of the best.

Although many growers focus on hydroponic solutions using synthetic nutrients, Haworth prefers 100 percent organic techniques. His farm has an outdoor grow area alongside a large greenhouse and several indoor grow-rooms. Everything is cultivated in naturally amended soil using proven organic methods. In fact, sofresh does more than just claim its products are organic; the farm has literally passed the test.

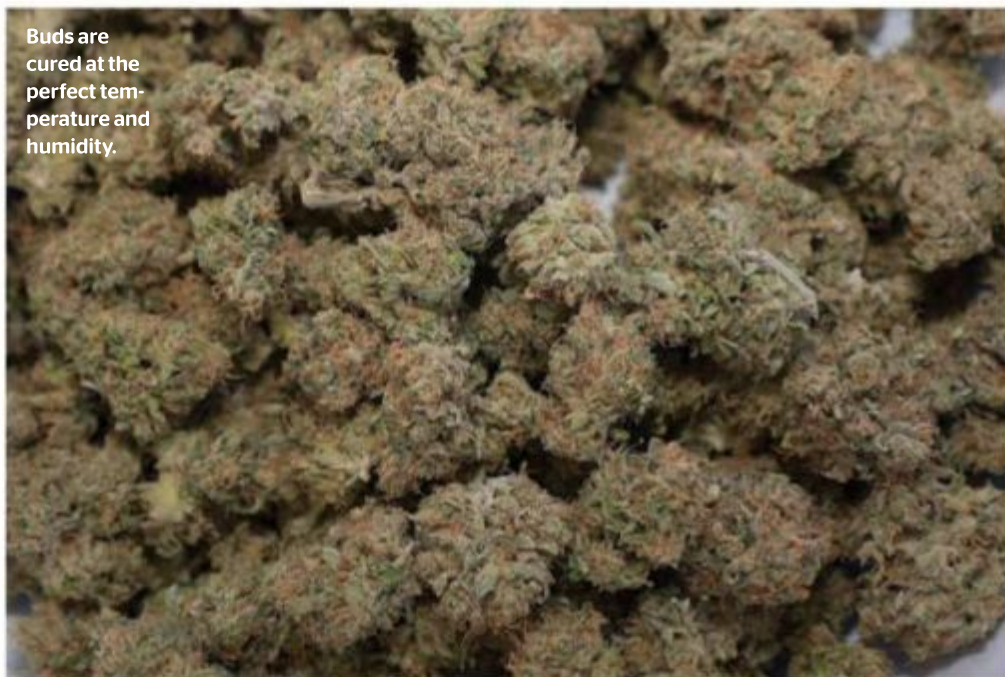
Everything sofresh farms grows is Clean Green Certified—a program that regulates cannabis products to certify they're grown organically. Generally speaking, organic growing methods work in harmony with Mother Nature. But sofresh farms takes this organic approach to a whole new level. However, even though a perfect organic environment ensures the best possible results from a given genotype, if you don't start with the right genetics it's all a waste of time.

And Haworth starts with excellent genetics—some of the best in the world. He acknowledges that growing the right strains is crucial to the foundation of any grow, and he's always on the hunt for outstanding genetics. Selection is crucial to sofresh's customers, so the company

Plants maturing in a greenhouse at sofresh farms



Buds are cured at the perfect temperature and humidity.



always keeps a couple dozen strains running. Additionally, sofresh makes sure that a few of their most popular varieties are always on hand—but even some of the farm's most legendary strains sell out quickly.

At sofresh farms, Haworth doesn't run mother plants. He prefers to take his clones from vegetative plants instead. That way he can run a large selection of strains without having to waste valuable space and resources keeping the mother plants alive. In his experience, he hasn't had any issues with genetic drift using this technique. In fact, Haworth claims that you can take a plant that looks like it's been experiencing genetic drift and place it in a healthy environment, and the plant will take off like it was a brand-new seedling.

Haworth feels that clones root better if you cut them right after the first week

of flowering, as the plants are already in a transition phase and they tend to root more easily. He uses a hybrid cloning technique that utilizes a root plug inside a traditional aeroponic cloner. He takes cuttings from the healthiest plants, dips them in rooting gel and places them into the plugs.

Haworth takes large cuttings, looking for fresh, green stems with no woody growth, and he uses a razor blade to make a clean, sterile cut. The clone room is kept very humid with a large humidifier, and the cuttings usually take seven to 14 days to root. Haworth prefers fluorescent lights for clones, as they promote vegetative growth and are mild on the plants. He explains that too much light can cause the plants to wilt: "You want just enough light to promote root growth without killing the plants—we want roots, not leaves."

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After the clones pop roots, they are moved into either 1- or 3-gallon pots, depending on the genetics. Haworth prefers to use smart pots for the vegetative stage of growth. He explains that smart pots help prevent transplant shock, which plants can experience for up to a week. Smart pots can practically eliminate this, and they also allow roots to breathe more easily and have the added benefit of air-pruning the roots.

At sofresh farms, the veg plants are kept in a greenhouse with supplemental lighting providing 18 hours of light. A combination of sunlight and artificial light allows the plants to “harden” and acclimate to the sunlight. Plants can get sunburnt just like us humans, and hardening the plants is similar to giving the plants a base tan. Then, after they’re acclimated to the bright lights or sunshine, the plants are moved into the flower stage—and that’s where the real magic begins.

The sofresh indoor growing area uses a closed-loop system with no-till raised beds. Haworth prefers to use high-pressure sodium (HPS) lights, but he’s always testing new systems and reflectors. Lately, he’s been researching three different light configurations to find the most efficient system possible. Haworth’s also been measuring the differences between a closed-loop system with supplemental CO₂ and a hybrid system with fresh-air ventilation. In the winter, sofresh farms brings in cool air from the outside instead of using air-conditioning. This not only uses less power, but it also replenishes CO₂ naturally. But during the hot summer months, sofresh farms runs air-conditioning to keep the temperature below 85°F. This keeps terpene loss to a minimum, which helps with fragrance intensity.

The raised-soil beds that sofresh farms uses stand about 2 feet high and comprise a mixture of peat moss, perlite, worm castings and compost, as well as other common additives, with the ultimate goal of creating synergy between the plants and soil. Haworth creates a “living soil” by building an environment that is perfect for both beneficial bacteria and the cannabis crop. He starts by inoculating the plants early in the vegetative stage and then carries it through to flower. Haworth brews his own tea, but instead of adding bacteria to the brew and letting it ferment, he adds the compost extract directly to the soil and lets the beneficial bacteria break it down. Basically, he’s feeding the bacteria that help his plants. This makes the beneficial bacteria very healthy and happy,



and they respond by breaking down the nutrients the plants need in order to flourish. This symbiotic relationship is a key element to any successful organic grow.

If you’ve ever hiked down a dirt trail, you already know how soil gets compacted by people walking on it. Haworth says that one of the worst things that can happen to soil is having it compacted so much that all the minute air pockets are destroyed. Those small spaces not only store oxygen, but they also act as water reservoirs and allow roots a place to grow. That’s why Haworth built wooden walkways above his flower beds, which help keep the soil fluffier than grandma’s pancakes and the buds as sweet as syrup.

Have you ever been out hiking when your feet get soaking wet, and then when you take off your shoes your feet look like a couple of raisins from hell? Plants don’t like their feet—their roots—getting that saturated with water any more than you do. That’s why keeping the soil’s moisture content in perfect balance is so important. Anyone can throw some water on the ground, but it’s a lot more complicated than that. Haworth is the master of moisture balance. How does he do it?

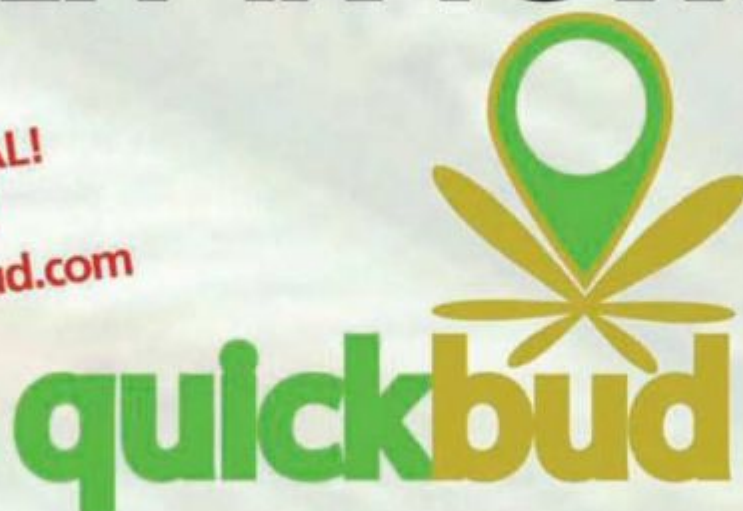
First, Haworth uses a thin layer of straw mulch on top of the soil to keep moisture from escaping while still allowing the soil underneath to breathe. He’ll push aside the straw and stick his hand in wrist-deep, pulling out a clump of deep black soil that he compacts in his hands, making a small dirt clod. He explains that if the soil is too dry, the dirt clod won’t hold together. The clod should break apart easily. If it doesn’t, there’s too much moisture. This simple technique allows Haworth to keep the soil at exactly the right balance.

Haworth feels that there are benefits to growing plants together in the same bed. They’re able to share microbes and worms, and they also communicate with one another. Plants need room to grow both above- and belowground. Haworth accomplishes this by preparing the soil deep below the raised beds so that the plants’ roots grow freely. Growing large plants in small pots is like trying to squeeze into last year’s swimsuit. You could pull it off, but no one is going to be happy about it.

Top: Air pruning helps build roots. Middle: Supplemental lighting keeps plants thriving. Bottom: Environmental control is essential to success.

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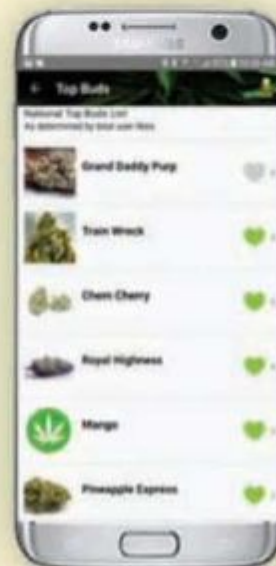
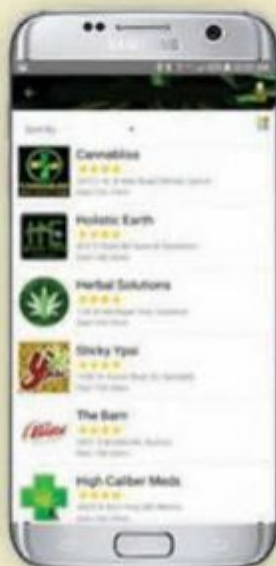
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Whether you feed your plants synthetic or organic nutrients, the goal is usually the same: tasty bud! Haworth believes that an organic approach is best for both his plants and his customers. So not only does he hunt down the finest organic ingredients money can buy, he also makes his own.

At sofresh farms, they take the leaves and stems from the thinning and trimming process and put them into large 55-gallon containers. Water and lactic-acid bacteria are added to the mix and allowed to stew until the concoction smells like an old gym locker. When the mix stops bubbling, the lid is removed and the alcohol is allowed to evaporate. What's left is the perfect blend of nutrients in the perfect ratio. During the flower stage, Haworth adds more stems and fewer leaves. This blend, combined with naturally amended soil, makes for beautiful and healthy plants.

Haworth's sofresh farms takes organic pest control to a whole new level. It's called "integrated pest management," or IPM. Under a canopy of a cannabis growth, other plants such as grass and clover are planted. The purpose in growing cover plants is to provide an environment that is friendly to predatory insects, and it also creates a symbiotic relationship with the cannabis plants. Haworth explains the different types of plants he uses.

"Trap plants" attract the bad bugs, and basically act as an all-you-can-eat buffet, featuring all kinds of yummy stuff for these bad bugs to eat. Haworth closely monitors the trap plants for any signs of pests that could mean an infestation for his crop.



In addition to trap plants, the farm also uses "deterrent plants" that help keep pests away. Plants like rosemary, mint and peppers repel problem insects and mites. These deterrent plants are like growroom bouncers, keeping away any unwanted guests. Haworth views trap plants and deterrent plants as the first line of defense for the grow. But he also uses other methods to keep pests at bay.

Not every type of bug is bad for your plants. There are many types of predators that eat the insects that eat your plants. Most likely you're familiar with many of the common types of predator insects, such as ladybugs and praying mantises, but you may be less familiar with nematodes or fungi. When these little fellas invade the host's body, they eat it from the inside out, and then use it to eliminate other pests. This natural approach to pest management helps eliminate pesticide use and creates a healthier environment.

The last line of defense against garden pests is the use of organic sprays such as soaps and neem, cinnamon, lemongrass and other types of oils. These sprays either suffocate the pests or make the plant taste bad to them. Neem oil has been used for centuries and controls virtually every type of pest, and a small amount of it is all it takes to make the bugs dine elsewhere. Haworth also uses PFR-97, an organic solution that contains a naturally occurring fungus which kills many of the bad bugs on leaves and in the soil.

There's a large greenhouse at sofresh farms in which budding plants are spread out as far as the eye can see. Some of the greenery resembles mini-skyscrapers, while other verdure grows low and dense. There are three levels of netting laid out into 6' x 6' grids, each with a 1,000-watt light over it. Haworth explains that the netting helps train the plants to create a solid canopy of dense buds roughly two feet thick.

Haworth inspects the plant's trichomes to determine the correct harvest time, looking for the heads to be mostly cloudy with some turning amber. He doesn't like to wait too long for harvest, as a plant's terpenes can start to degrade. Harvest time is strain-dependent, so over the course of a month, plants will be pulled and processed.

Top: SCROG (Screen of Green) growing methods create a canopy of lush flowers.
Middle: Beneficial ground cover helps reduce pests.
Bottom: Flowers form on budding branches.

Betty Hayes



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Hanging branches to dry preserves delicate trichome glands.

There are multiple drying rooms set up to accommodate sofresh farms's various crops. Some hold large, untrimmed outdoor plants, while others contain rows of buds hanging from the ceiling. These are from the indoor grow and already have their fan leaves removed. It looks like all it would take is a couple of good snips for these buds to be ready to enjoy.

Haworth starts the buds out at a fairly low 40 percent humidity level and raises it over a few weeks to 50 percent, with

the ultimate goal of hitting 60 percent. He explains that anything above that adds moisture to the bud, and anything below that dries it out.

When the buds reach the perfect level of dryness, they are hand-trimmed by some of the best trimmers in the world. The buds are handled very carefully; workers avoid touching the pot with their bare hands and only use the tips of their scissors. Every kickstand and crow's foot is clipped with only frosty goodness left behind. Every flower is trimmed to the

perfect size—not too big, not too small. After the nugs have been trimmed, they're placed in large totes to cure. This process takes from a few weeks to a couple of months' time, depending on the strain. The totes aren't airtight, allowing the buds to breathe and slowly cure to perfection. Cure time can make a huge difference in how the finished cannabis smokes.

After spending time in the large totes, the pot is transferred into gallon jars. Haworth pulls a bud out of one and holds it up, bending the stem until, at a certain point, it snaps. That's exactly what he's looking for. If the stem bends but doesn't break, it's still too wet. If the stem snaps right away, the bud's too dry.

The product from sofresh farms is legendary in Oregon but what really sets sofresh apart is its staff. After spending time with the sofresh crew, I can't help but feel amazed at their vast knowledge of growing technique. Plants come and go, and all those beautiful buds are just a hit away from disappearing in a puff of smoke. The farmer, not the plants, makes the farm, and Tyson Haworth is without equal. The next time you're in Oregon, stop by the nearest pot shop and ask for sofresh farms. ✨

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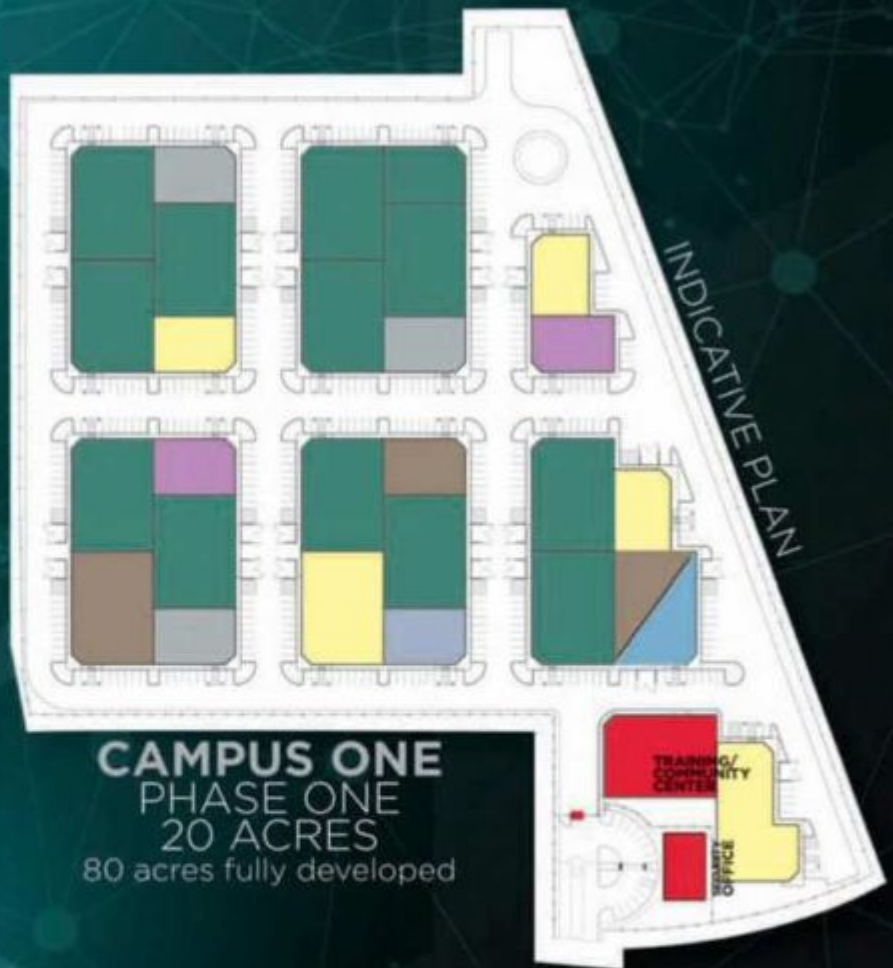
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Drug Testing 101

The drug testing industry has its roots in 1980s-era Drug War paranoia. Thirty years later, it has ballooned to a multi-billion dollar industry operating at the expense of the working class. In spite of state-wide legalization efforts, mandatory drug screens for job seekers remain prevalent throughout the country. *By Joel Warner*



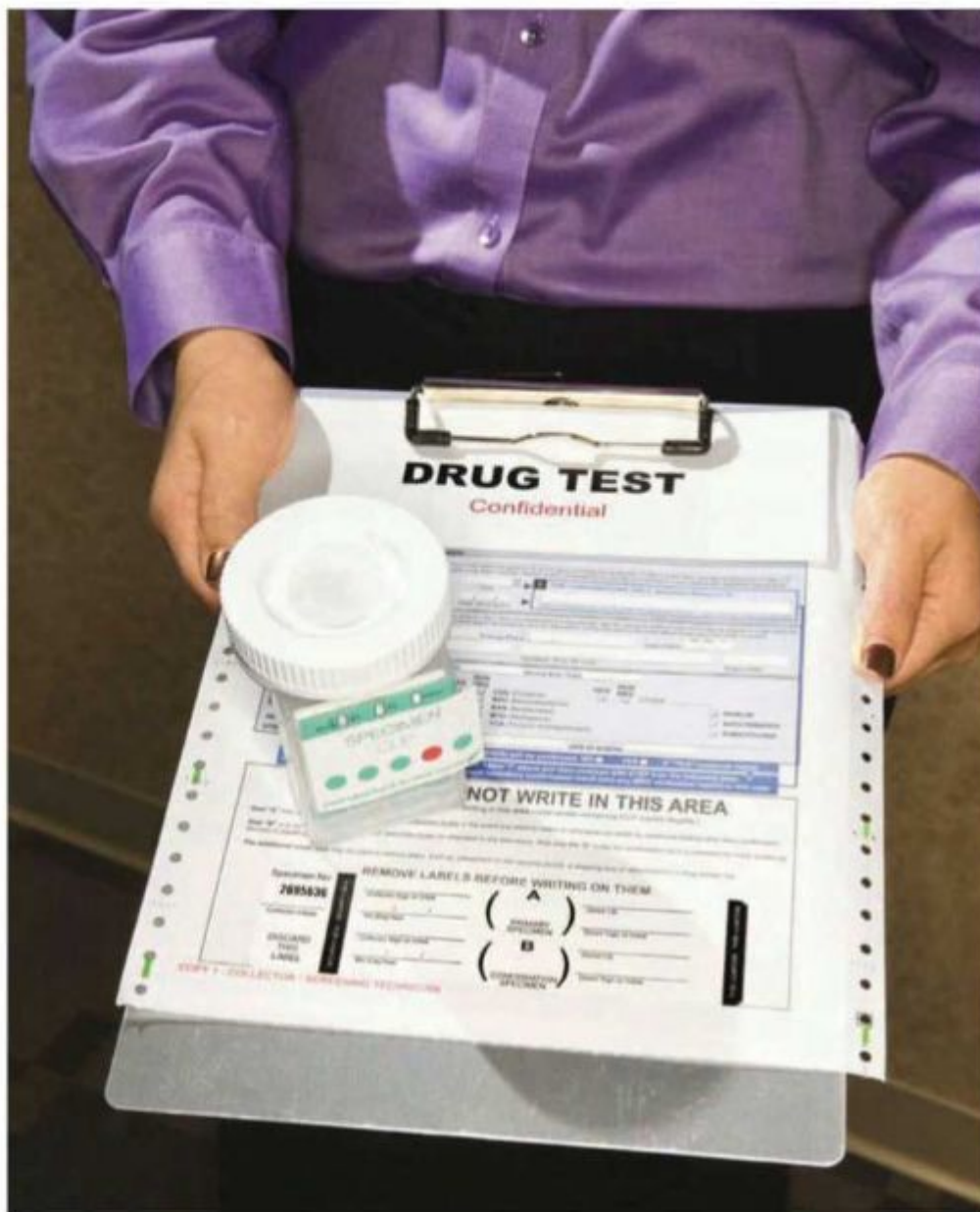
When O.penVAPE, a Denver-based manufacturer of vape pens and cannabis-oil cartridges, began expanding from a promising start-up to a midsize business in 2014 during the heady early days of Colorado's recreational-marijuana market, company executives decided it was time to establish concrete human-resources policies. Among other steps, O.penVAPE, now part of Organa Brands, instituted a drug policy developed from boilerplate language used by many employers. The result was a typical company drug policy: If employees were involved in accidents, they would be drug-tested. If they failed, the company would be released from any liability, and the employee would be disciplined, up to and including termination.

"We just cut and pasted this drug policy and really didn't give a lot of thought about it," says Organa Brands president Chris Driessen. But when marijuana activists began crying foul, the company realized its mistake.

"We were lucky to have colleagues at Drug Policy Alliance step forward and say, 'Wait a minute, guys, you are a cannabis company, you want to support civil rights, why don't you take this opportunity to lead [on the drug-testing issue]?"' Driessen says. "At the same time, we were a midsize company with significant revenue—how do we not put the company in harm's way if we don't have a policy in place or have something that's so loose it becomes a liability?"

O.penVAPE had run headlong into a major conundrum lying at the center of the country's marijuana-law reforms: What should companies—and workers—do when they're based in states that have declared medical or recreational cannabis use utterly legal, but still allow employers to test and penalize employees for using marijuana? How should companies adjust their drug policies to reflect the changing times—and what should workers do if they don't?

"The reality is arguably, after broad public policy that effectively criminalizes cannabis use, this is probably the public policy that continues to adversely affect the largest segment of the marijuana-using population," says Paul Armentano, deputy director of the National Organization for the Reform of Marijuana Laws (NORML). "I think there needs to be more concerted effort made by both the cannabis industry and the reform movement to recognize this is a real problem, and the mission is not accomplished until an adult can use cannabis



The rise of workplace drug testing goes hand in hand with Ronald Reagan's War on Drugs.

responsibly off of the job and not suffer workplace discrimination."

The rise of workplace drug testing goes hand in hand with Ronald Reagan's War on Drugs. In 1986, in response to widespread illicit drug use in the military, President Reagan issued an executive order requiring federal employees and some government contractors to be drug-tested in order to create a drug-free federal workplace. The resulting guidelines stipulated that all federal agencies could elect to test for opiates, amphetamines and PCP, but must at a minimum screen for marijuana and cocaine.

Before then, the idea of employers testing workers for drug use was largely unheard of. But suddenly, an entire drug-free-workplace industry sprang up, one that catered not just to federal

agencies, but to the private sector, too. Soon drug testing programs, along with invasive personal searches and drug-sniffing dogs, were being instituted at companies from coast to coast. In 1987, when the American Management Association began polling its members on drug testing, 21 percent said they screened employees for drug use. In 1996, 81 percent said they did.

But as workplace drug testing became increasingly common, concern grew that there was little evidence proving such screenings accomplished what they were supposed to, such as increase workplace safety, improve productivity and boost morale, not to mention discourage employee drug use. (Some employers also have a direct financial incentive to test, thanks to discounts they receive on their workers' compensation premiums.)

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“Drug testing was sold to employers under the premise that it would improve worker safety and productivity, and it didn’t,” says Lewis Maltby, president of the National Workrights Institute and author of an influential 1999 American Civil Liberties Union report questioning the effectiveness of drug testing. “Eventually, employers realized they were being conned, and they stopped paying for it once they realized it didn’t help their bottom line.”

Thanks to such criticisms, since the late 1990s drug-testing rates have fallen. But a large percentage of Americans are still subjected to drug screening, either before they are hired, after a workplace accident or at various times during their employment. The vast majority of these tests involve urine testing, and the most common drug that shows up in such screenings is marijuana, both because its use is so prevalent nationwide and because traces of the substance remain in a user’s system for a much longer period of time than other common drugs do. Quest Diagnostics, one of the country’s largest medical-screening laboratories, reports that positive marijuana test results have been on the rise lately. And in particular, according to the company’s most recent statistics, Colorado and Washington, the first states to launch legal marijuana markets, have seen increases in positive marijuana test results that outpace the national average by roughly two to one.

That’s because although voters legalized adult marijuana use in these states in 2012, the ballot questions were written in such a way to allow employers to continue to penalize cannabis use. “There might have been recognition among some of the organizations involved in the drafting of those initiatives that public opinion often changes more rapidly than one’s ability to change long-standing bureaucratic policies,” says NORML’s Armentano.

Colorado, Washington and most of the other states that have legalized medical or recreational cannabis also feature at-will employment rules, which means employees there can be fired for any reason and without warning. It doesn’t matter if someone is a registered medical-marijuana patient, or is abiding by their state’s recreational cannabis laws. It doesn’t matter that a positive workplace marijuana test doesn’t necessarily correlate with cannabis consumption or inebriation at work. As the Oregon Supreme Court ruled in 2010, the



Employers could soon begin moving in the opposite direction, by advertising the fact that they don’t drug-test as a recruiting strategy.

Washington Supreme Court ruled in 2011 and the Colorado Supreme Court ruled in 2015, employers are free to terminate workers for marijuana use, even in states where cannabis is legal.

“For the most part, in those states that have legalized cannabis in any way, shape or form, most courts who have addressed this issue have determined employers may exclude individuals for positive drug tests, even in the face of laws that you have to accommodate certain disabilities,” says Alex Wheatley, a Portland, OR-based employment attorney at Fisher Phillips who represents cannabis-related employers.

Developments like this are likely why when HireRight, a background-screening company, recently surveyed human-resources professionals nationwide, 78 percent of respondents said they’re not planning on changing drug-screening policies to reflect marijuana reforms.

But there are some indications that employers are starting to change with the times. In 2014, the Mountain States Employers Council, a nonprofit that helps employers in the Colorado region with employment law and human-resources issues, surveyed its 1,648 members and found that one in five were implementing tougher drug-testing policies in response to the state legalizing marijuana. In late 2016, a new version of that survey found the opposite: 7 percent of respondents reportedly removed

marijuana from pre-employment drug tests, and 3 percent dropped it from all workplace drug screenings. According to Curtis Graves, attorney for the nonprofit (which now goes by the name of the Employers Council), over the past year or so, some of these employers began utilizing a new type of drug test that doesn’t screen for cannabis at all.

In Oregon and Washington, Wheatley says employers are also starting to drop cannabis drug tests or resorting to such screenings only when there’s reasonable suspicion of impairment at work.

Graves thinks companies in places like Colorado are being forced to rethink their drug policies because of the challenges of hiring qualified candidates in a state with record-low unemployment levels, a situation that’s in part due to all of the new marijuana-industry jobs. “It’s a matter of business reality,” Graves says. “Many employers would prefer to be zero tolerance. But even those who have staunch personal opinions against marijuana have realized it’s not always practical to do pre-employment drug testing.”

Graves believes there could also be another factor at play. Despite claims by some marijuana opponents that legalized cannabis would lead to massive social costs and workforce disruption, Graves says, “As far as people calling me with a massive spate of incidents [related to marijuana use], that hasn’t happened.” Graves thinks that could be leading some companies to rethink the idea that drug tests automatically lead to a safer workplace. “I think what employers are starting to come to terms with is they are not up in arms over off-duty marijuana use if it is not leading to impairment in the workplace,” he says.

If this trend continues, employers could soon begin moving in the opposite direction, by advertising the fact that they don’t drug-test as a recruiting strategy. John Sullivan, a talent-management expert and professor at San Francisco State University, believes that could especially be the case as California develops its legal marijuana market. “It’s not just about marijuana use, it’s about freedom,” he says. “I work in Silicon Valley, where innovation is critical. If we are all about promoting freedom, we shouldn’t worry about what people do outside of work.

“If word gets out around here that you drug-test, it’s like a kiss of death,” Sullivan adds. “Just because it’s legally okay to fire someone for being high on the job, that doesn’t mean you should.”

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The founder of *drugtestinginsider.com* says he's a lab technician at a drug-testing facility who launched the site five years ago to expose what he sees as the moral bankruptcy of the drug-testing industry: How a single bad drug test can overshadow every other job qualification for a job applicant or employee. How the multibillion-dollar business fuels rampant and invasive drug screenings among the working class. How the tendency of test methods to return false positives can ruin people's lives. How drug screening in particular penalizes cannabis users, since evidence of the drug can remain in the body for 30 to 60 days.

But the site's founder, who asked to remain anonymous, also has scorn for many of the companies that promise to help people pass drug tests. "They sell hope and misinformation," he says. "You will find a lot of bad information out there."

For starters, he's not a fan of "detox" products that claim to quickly cleanse people's bodies of all traces of THC. "They might have worked 10 years ago, but as marijuana has increased in potency, the THC levels in your body are too high now," he says. Even if these

products are successful in diluting THC levels by forcing a user to fill up with liquids, he says the resulting low density of the user's urine could alert testing facilitators that something's amiss. If you really want to detox your body before a drug test, abstain from cannabis, exercise regularly and drink lots of liquids—starting 30 to 45 days before your screening. Not only will all

notes that there are even products now containing live bacteria that mimic the microbes found in real urine, but he also warns that these formulations often have a very short shelf life once they've been opened.

Matt Fox, a Colorado-based cannabis activist and caregiver, swears by synthetic urine. He used one such product to pass a drug screening prior to start-

Drug screening in particular penalizes cannabis users, since evidence of the drug can remain in the body for 30 to 60 days.

THC likely be out of your system, but you'll be healthier, too.

If such an extended regimen isn't an option, the man behind *drugtestinginsider.com* recommends synthetic urine, which he reviews on his site by running drug tests on the various brands. In general, he says that consumers should look for products that at minimum contain creatinine and urea, compounds naturally found in urine; have a balanced pH of between 4.8 and 8; feature a normal specific gravity; and can be safely heated to body temperature. He

ing a contract computer-programming job in Denver in 2015. "I went into the bathroom at the screening lab in Denver, extracted the bottle, poured half into the testing cup, the other half into the toilet, then put the bottle back where it came from," he says. "The next day, I got the call: 'You passed the drug test.'"

When he started the job, his coworkers were surprised—not that he'd passed the test, but that he'd been tested at all. "But it's Colorado!" one of them exclaimed.

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THE GAME HAS CHANGED

Article by Jeremy Deichen

Beautiful buds ready for harvest

Growing Exposed, a new video series produced by Jeremy Deichen, has been coined "the MTV Cribs of the marijuana industry" for its exclusive look into the once underground world of North America's gardens. Aside from revealing secrets of industry leaders, David Robinson, author of *The Growers' Handbook*, lends his expertise to a segment called *Teachings of the Garden Sage*. You can check out gardens, like the ones that make British Columbia's Kootenay region the Mecca of B.C. bud, on the latest episodes at growingexposed.com.

When Bryan Johnston began growing cannabis, it was the early '90s. He was using 1000 watt bulbs hung from the ceiling commonly referred to as "Donkey Dick" lights. During this period, British Columbia was becoming infamous for the highest quality bud on the planet and people were calling the province's crops "Beaster". A lot has changed in the 25 years since — including his setup and the base plant food he uses, thanks to Green Planet Nutrients.

An environmentally conscious guy, Bryan says he remembers, back in the day running those 1000 kilowatt bare bulbs. Today, his indoor garden uses a smaller wattage but yields dramatically more per watt than ever before.

**"Everything has changed.
The game has changed,"**

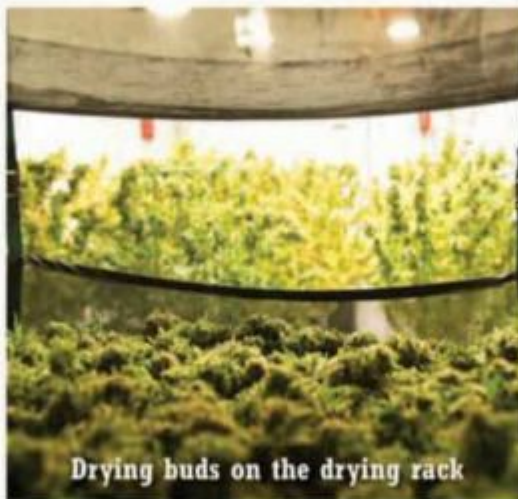
he says. "I'm running doubled-ended P.L. lighting with four Spectrum King 600-watt LED lights and doing a massive cross spectrum of light, running four 315-watt P.L. ceramic metal halides. So I'm totaling just under 4,700 watts and yielding on average, two pounds or more for every 1,000 watts of light."

The most recent change to Bryan's garden wasn't in setup though, but to a new base plant food. Manufactured by Green Planet Nutrients, Dual Fuel is a highly concentrated, two-part formula that provides all the energy plants need without the need for calcium or magnesium additives. It's known for an easy application process which leaves less room for error.

"I've tried different brands but I've been using Green Planet's Hydro Fuel and got fantastic results, so when I went to my local grow shop and got some samples of Dual Fuel about two years ago, it wasn't a stretch to give it a try," Bryan says. "But on some level, any type of switch is a leap of faith as a grower. People who consume my product are used to a level of quality and I can't afford to give them anything less than the best."

"The switch was really easy and the first noticeable difference was that my plants became way greener than before and they stayed lush green into the later stages of flower. It's also cleaner and I don't have salt residue or buildup. Plus I'm getting better and faster yields, so I'm saving about a week overall on my crop. I've done the math on what it costs to run other brands and not only am I saving money but I'm having better results."

With Dual Fuel, Bryan uses only three additives: Green Planet's Massive Bloom Formulation, Finisher, and Terpinator. He says when he's tested plants grown with the additives versus ones without, he's noticed way more cannabinoids.



Drying buds on the drying rack

Growing Lemon Haze since 2011, Bryan says this strain takes a little longer to flower than normal but the flavour and sativa experience is well worth it. He finds it easy to grow and the resulting product very consistent in quality. With the switch to Dual Fuel, Bryan says he noticed changes to his plants almost right away.

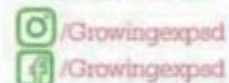
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Drug-testing companies and lawmakers have long worked to foil synthetic urine manufacturers. Federal regulators are looking into promoting oral-fluid testing as an alternative to urine-based drug screening; manufacturers are starting to sell liquids that test subjects consume to internally “bar-code” their urine prior to screening; and two states—New Hampshire and Indiana—banned synthetic urine outright this year. But for the time being, the man behind *drugtestinginsider.com* says the companies helping people pass drug tests still have the upper hand.

“It’s an arms race,” he says, “and they’re winning it, to be honest.”

Slowly but surely, policies around workplace drug testing and cannabis are starting to change. Medical-marijuana laws in Arizona, Connecticut, Delaware, Illinois, Maine, Minnesota, Nevada, New York and Rhode Island require employers to accommodate their employees’ state-sanctioned medical-cannabis use. And after years of court decisions ruling the opposite, in 2017 the Massachusetts Supreme Judicial Court and a Connecticut federal district court both held that employees who lost jobs because of off-the-job

medical-marijuana use could sue their companies for discrimination.

“I believe more states will come around to realizing that there should be accommodation of folks who are lawfully using cannabis,” says Wheatley in Oregon. “Whether that will take a change in federal law, I don’t know.”

In the meantime, NORML’s Armen-

drug use. “The idea was, impairment can mean a lot of things,” says Driessen, the company president. “Maybe your mom died and you are not in your right mind. Maybe you have allergies and you weren’t able to sleep well. Maybe you’re suffering from migraines or panic attacks. Maybe you’ve been doing substances that kept you up all night.

Drug-testing companies and lawmakers have long worked to foil synthetic urine manufacturers... But for the time being, the companies helping people pass drug tests still have the upper hand.

tano says people should tell lawmakers and employers alike that drug testing in the age of widespread cannabis-law reforms doesn’t make sense. “I think the public needs to really raise this and say, ‘This issue needs to be at the front of the line.’”

That tactic worked for O.penVAPE. After activists called out the company in 2014 for its outdated drug-testing rules, management developed a new policy, one that focused on workplace impairment rather than evidence of

Whatever the reason, if you are not in the right frame of mind to work, that means you shouldn’t be at work.”

Not only has the company not suffered any problems because of the new policy, but Driessen says the forward-thinking approach has helped the firm attract top-tier talent.

“I think where we landed was a pretty good spot,” Driessen says. “At the end of the day, I and all of my partners consume cannabis. And it doesn’t make us any less professional.” ✨

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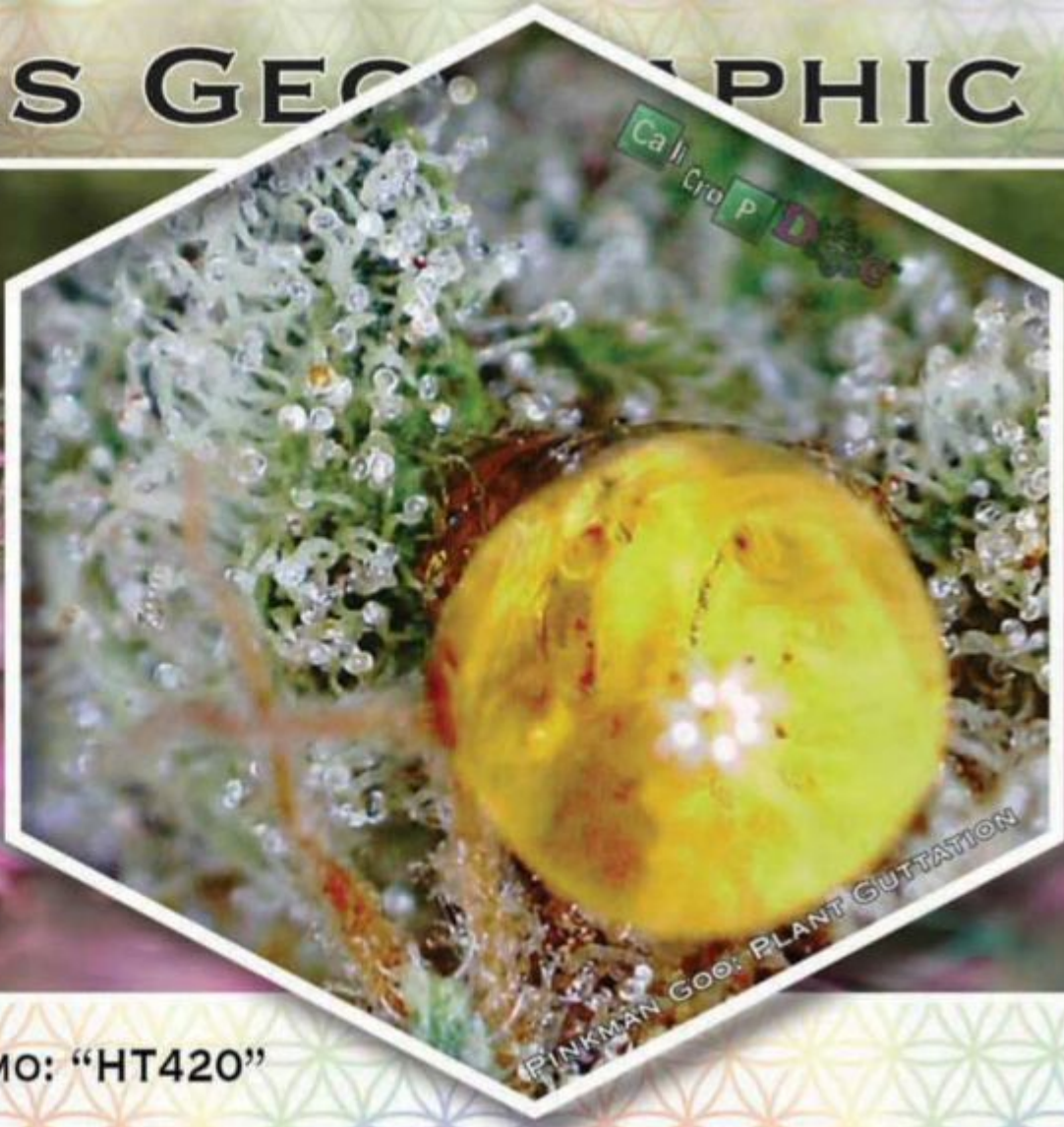


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Aeroponic cannabis propagation can help make anyone a master cloner.



CLONING THE EZ WAY

Aeroponic cloning results in successfully rooted cannabis cuttings quickly and easily. Learn the tips and tricks for prosperous cloning from industry pioneer EZ-Clone. *Story & Photos by Erik Biksa*

Experts familiar with the grow-gear industry say that the business today is just the tip of the iceberg. Once national legalization kicks in across North America, the gardening sector may never be the same again.

The industry that designs, manufactures and supplies your favorite growing gear didn't sprout up overnight—it's been evolving for decades through different legal and political climates and an ever-growing customer base.

Today's grow gear comes ready to "plug and play," and it's usually very simple and effective. Often, it's designed and tailor-made for growing cannabis, rather than being just a rough adaptation of equipment used in more mainstream agricultural practices.

One of the best companies offering this type of gear is EZ-Clone, which makes aeroponic cloning systems, including its newly released Commercial Cloning System.

EZ-Clone was founded in California by two former members of the US Air Force. They

started with off-the-shelf parts like Rubbermaid bins, producing a very effective system to root cuttings with aeroponics, and they advertised their gear right here in *High Times*.

Billy Blackburn, EZ-Clone's co-founder, discovered that cloning was a major challenge for most growers—a revelation based on his experience working in a hydroponics retail shop and from growing with his roommate, Brad Mickelsen (EZ-Clone's other co-founder), in their garage.

The aeroponic cloner Blackburn and Mickelsen developed was never meant for commercial production; rather, they built it to help make their own growing methods more successful and reliable. Naturally, after their early success, word spread as everybody who tried their early prototypes was amazed at how easy cloning could be. This was the beginning of EZ-Clone.

Starting off on a limited budget, as most garage-based entrepreneurs do, made creating high-tech plastic molds of the original

cloning system impossible. So, betting on proven performance and good advertising over elaborate packaging or design, Blackburn and Mickelsen utilized store-bought parts to make their model replicable and affordable.

Looking at what's available today from EZ-Clone, like the new Low Pro series or the Commercial Cloning System, it's easy to see how far the company's come. In fact, the entire cultivation-equipment industry has grown exponentially in the last few years. However, EZ-Clone has always viewed its success as based on its design concept and how the company strives to provide reliable plant-propagation systems that make successful cloning and seeding easy for everybody.

EZ-Clone's new Commercial Cloning System has created a new benchmark in hydroponic-system design and excellence. Featuring cutting-edge aeroponics, it's the result of 16 years of product research and development and feedback from thousands of aeroponic cloners from around the world.

The Commercial Cloning System ships on a pallet and is ready to plug in. Just fill the unit with your favorite cloning solution and you're set to root up to 460 healthy and robust cannabis transplants in an approximately 2' x 4' x 7' area. Because the system is built on sturdy wheels, moving it around on a firm surface is a breeze, even when the system is operating.

Interestingly, the new Commercial Cloning System operates differently from other aeroponic cloning systems on the market, including those from EZ-Clone's own earlier lineup.



The Commercial Cloning System

EZ-Clone's Commercial Cloning System is the latest in aeroponic design and function, new grow gear built from the ground up.

One of the key areas that sets the Commercial Cloning System apart is that there is no depth of solution maintained inside the closed cloning chambers. Instead, each of the chambers drains completely to a central reservoir, eliminating standing water. High-pressure mist nozzles and a filtered drain port are perfectly fitted into the base of the sealed cloning chambers.

Another crucial difference is that the mist in the aeroponic chambers is very fine, delivered under high pressure from fewer (although more finely engineered) mist nozzles. These are like those you see in the produce section of your grocery store; they create a super-fine mist as opposed to the thin, cone-like water jets that are the norm.

Because the closed cloning chambers drain completely and the moisture is applied as an ultra-fine mist via a recirculating pumped reservoir, the frequency and duration of spray cycles can be set to control the oxygen-to-water ratio

that is so critical to success.

For example, to propagate a more *indica*-dominant strain, you can keep more air around the stem for faster and better rooting, based on the variety. In this instance, you might increase the "off" time of the pump to accomplish this with ease. Two dials control the pump: one for the relative off time, the other for the relative on time. You can vary the oxygen-to-water ratio in the cloning chambers in seconds, based on the strain or the number of days into the cloning process, or even based on surrounding environment (for example, if your cloning area is a little



drier at certain times of the day).

This level of precise oxygen-to-water management at the root zone also makes the Commercial Cloning System a powerful tool for cannabis researchers. Irrigation strategies are a big deal, especially for commercial growers. Different strains have different preferences when it comes to moisture levels at the roots, and finding the sweet spot can mean +/-20 percent in yields or resin quantities. Learning about these differences can increase profitability by a significant amount. What cannabis researchers can assess with this level of control in a 2' x 4' area can be applied to tens of thousands of square feet of cropping in soilless or hydroponic media (i.e., drip irrigation) and accelerate the benefits of crop-management strategies.

The system stacks up to three tiers high and wheels in and out of common spaces with ease on a sturdy-built powder-coated frame. All the plumbing and wiring is tucked neatly and safely out of sight. One of the many well-thought-out features is the use of slide-outs. The plumbing for each tier uses quick-connect fittings and locking metal rails, so when you want to work on a tray you can slide

it out like a drawer without interrupting the mist cycle on the other two tiers. There's just one power plug, compatible with any common North American wall outlet, and that's it—you're ready to start up to 460 clones. The folks at EZ-Clone thought of everything!

While a cloning system of this capacity is typically reserved for commercial producers, it will be interesting to see what follows next for the smaller-scale or home bud grower in the way of aeroponic applications from EZ-Clone and the proven technologies the company continues to introduce to discerning cannabis cultivators everywhere.



Left: The system stacks for additional plant propagation in less space.

Right: EZ Clone has perfected the art of cloning crops of cannabis consistently and successfully.

Bottom: Racks can be emptied or filled independently, allowing growers to cycle different crops of clones as needed.

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Aeroponic Power

In most aeroponic cloning systems, water or nutrient solution is held inside at the base of the aeroponic unit. The aeroponic system lid provides support to the plants or cut stems, while the pump below in the water or solution typically creates a spray beneath the cut stems or roots inside the system supported by the lid. This is the basic principle behind many common aeroponic systems.

The spray infuses a profusion of oxygen from the air into the nutrient solution due to having a large surface area—more than droplets or a stream. This is the key principle behind successful plant propagation: having a good oxygen-to-water ratio around cut stems or seeds. Adding more oxygen supercharges the process and can make for some huge performance gains when applied correctly. Overwatering, which creates a low oxygen-to-water ratio, is usually the number-one source of problems in starting seeds or cuttings. Aeroponics done correctly avoids this issue and even amps up the process for a better end result.



Aeroponic Advantages

There are many advantages to aeroponic cloning, including:

- No medium to throw away or replace; reusable neoprene collars support cut stems.
- Big cuttings that root faster. Aeroponics can take up to two weeks off of a normal cropping cycle because plants need less time in veg when they are taken from larger cuttings with several full sets of leaves.
- No humidity dome is required as long as the system is set up in an area with no strong air movement and average humidity levels. This is a huge advantage, as humidity domes may lead to rot and other adverse effects.
- For organic growers, it's possible to root healthier cuttings faster without using synthetic rooting gels (although they do improve the process). Instead, microbial inoculants can be effective in the place of rooting hormones in these systems—for example, mycorrhizae fungi or bacillus bacteria.

continued on page 130



Color coded plant support collars make it easy to identify different batches of cuttings.



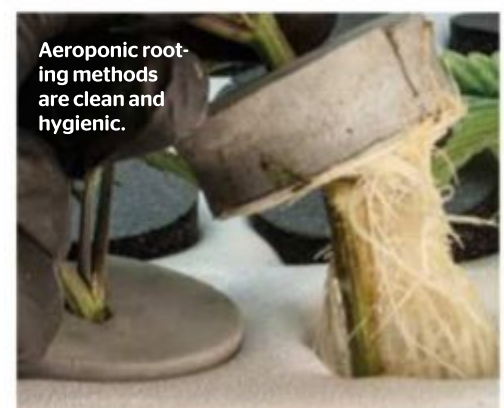
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A Tale of



The prestigious pot prizes were designed by legendary artists Alex and Allyson Grey.

Two Cups

High Times had a busy summer, hosting the mother of all marijuana festivals back-to-back in Canada and Michigan. *HT* culture editor Mary Jane Gibson and senior cultivation editor Danny Danko break down all the action from these two epic events! *Photos by Jesse Faatz*

North of the Border

There's something in the air on Vancouver Island—the whole place feels mystical, magical, ancient and powerful. Adding to that sacred spirit, clouds of pot smoke created a golden summer haze among the dark pines ringing Lake Cowichan at the first-ever Cannabis Cup Canada.

For three days in August, the American team behind High Times events worked with its Canadian counterpart to bring the Cup to the Laketown Ranch Music & Recreational Park, a woodsy arena with a massive main stage, a jewel of a second stage on a hillside overlooking the grounds and onsite camping for dedicated festivalgoers. The musical lineup was impressive—along with Cana-



The massive main stage showed off a variety of musical acts.



Canada's finest flowers competed for dominance.

dian stalwarts Sloan and Magic!, hip-hop heavyweights Wyclef Jean and Lil' Kim hit the stage for blazing headline sets. House of Pain brought the house down. Arrested Development had the crowd dancing and hollering for joy. And on the second stage, old-school punks Dayglo Abortions, all-clown Iron Maiden cover band Power Clown and world-music fusion group Delhi 2 Dublin played incredible sets as the sun dipped behind the hills and turned everything the most glorious pink and orange.

On Saturday night, many folks crowded into a huge tent to get a glimpse of the fight everyone was talking about—Floyd Mayweather versus Conor McGregor. Though we were watching two men knock the crap out of each other in Las Vegas, the vibe on the island was positive and peaceful. Ah, the power of pot.

In 2000, Canada became one of the first



Lil' Kim fired up the crowd.

countries in the world to rule that its citizens have a right to use cannabis for medicinal purposes. Seventeen years later, the weed scene in Canada is flourishing, with the country preparing for full marijuana legalization by Canada Day (July 1) next year. Even Snoop Dogg is getting in on the game—the OG weed rapper just invested in a Canadian cannabis software provider for tracking seed-to-sale.

Although recreational marijuana is not yet legal, British Columbia is very pot-friendly—in keeping with the rest of the West Coast from Alaska to California. BC's largest city, Vancouver, has blazed trails in creating regulations for its gray-market medical-marijuana dispensaries. Hence its weed moniker, "Vansterdam." It's an amazing place to visit, with a dramatic backdrop of mountains, an abundance of incredible flora and fauna (Orcas! Sea otters! Salmon!), and a bounty of amazing restaurants and nightlife. Get yourself some tasty BC bud to complete the experience and you'll never want to leave. Many High Times staffers declared Vancouver Island to be their favorite Cannabis Cup venue yet.

At the Cup, Vendor Village hosted a familiar assortment of friendly faces, interspersed with lots of our likable northern comrades. Premier American sponsors Advanced Nutrients and Rosin Tech shared the outdoor space with Canadian sponsors BC Bud Depot and Phyto

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A hat trick!

Extracts, alongside up-and-comers like Mota and Optimal Rush, both winners at the awards show on Sunday afternoon. Another big winner at the show was Diamond Concentrates, scoring a hat trick with three Cups and then stacking a couple more on top of the pile!

Senior cultivation editor Danny Danko dropped his grow knowledge in a “Free Weed” seminar, and longtime pot activists like Dana Larsen and Neil Magnuson spoke about their hopes and dreams for a future in which all people have the right to openly consume cannabis without fear of arrest or persecution. Magnuson also stepped up to the mic at Sunday’s awards show with his rendition of “O Cannabis,” a play on the Canadian national anthem. Jeremiah Vandermeer of Cannabis Culture co-hosted the show with Danko, making it a true across-the-border collaboration. There were chuckles from the crowd when a missing trophy made for a “stoner moment,” but the prize was quickly found and bestowed on the happy winner. For a full list of the best of BC’s cannabis products, turn to page 106.

High Times hosts several Cannabis Cups throughout the year, across the United States and beyond. We wouldn’t be able to do it without our truly incredible production staff. Putting an event together from the ground up is a huge feat no matter what. Add in difficult weather and artists of all types and temperaments, plus the key component of our events—weed—and you’ve got quite a renegade production on your hands. We are very fortunate to have a team that loves cannabis as much as we do. Hats off to all of our crew, from stage managers and site ops to runners and box-office staff. We love you, guys. See you at the next event! *Mary Jane Gibson*



Marijuana medals



Chefs flex their skills.



NBA legend Cliff Robinson

Michigan Cannabis Cup

On September 9 and 10, High Times hosted the illustrious Cannabis Cup at the Auto City Speedway in Clio, MI. The purpose of these ganja gatherings is to celebrate the gains we’ve made in marijuana-law reform and to renew our energy to continue the struggle until our beloved flower and all peaceful pot prisoners are set free. Our goal is to educate the public on the many benefits of this healing plant and remove the stigma that’s been placed on cannabis consumers.

The Auto City Speedway provides a unique setting for our party. As we speed toward cannabis legalization, we must remember to slow down and savor the many amazing gains that have been made, particularly in the many new ways we can consume and use cannabis.

The booths at the Cannabis Cup provide a wide range of products, from vape pens and dab rigs to edibles, topicals, tinctures and more! Many new pieces of equipment have their debut at the event, including innovative grow technology, impressive hashish-extraction units and, of course, tons and tons of incredible functional glass art!

The seminar area is always popular with people seeking to learn more about cannabis



Redman and Method Man put on a show.



Live plants on display

cultivation, concentrate production, legal issues or establishing a marijuana business. I had the honor of hosting a talk with NBA legend Cliff Robinson in which he spoke about the benefits of cannabis for professional athletes as well as the stigma and financial costs of getting busted for weed in the big leagues.

The most compelling seminar at the Cannabis Cup is always the veterans' panel. When servicemen and women talk about how marijuana helps them with post-traumatic stress disorder or brain injury, the emotions in the room are palpable. It's difficult, but so important, to hear them discuss their harrowing wartime experiences and how they lost so many colleagues to alcohol, pills and suicide afterward. The fact that our government still denies most of them access to cannabis is a shame on all of us.

On a lighter note, the edible tent hosted an exciting cooking competition in which several food-service professionals competed for the title of "Top Cannabis Chef." Dish after dish of marijuana-infused meals were judged by a panel of experts until one final winner was chosen in the championship round!

Music is always an important element to any productive pot party. Performances on

Saturday included Willy J Peso, local hip-hop hero Trick-Trick, Tyga, Wyclef Jean, Bone Thugs-N-Harmony, Method Man and Redman, and Lil' Kim.

Sunday's award show was hosted by cannabis celebrity Adam III, with plenty of product giveaways tossed to the eagerly awaiting crowd. Winner after winner graced the stage to collect their trophies for best flowers, concentrates, edibles and more. I love to see the joy on the faces of people as they process the fact that they've won the big one. Their heartfelt speeches, holding the masterpiece Cups designed by renowned artists Alex and Allyson Grey, remind us of all the hard work that went into earning such an illustrious prize.

After the award show, Kid Vishis, Royce da 5'9", Akon and a special DJ set from EDM legend Steve Aoki closed out the Cannabis Cup in style (and a little bit of cake).

Special thanks to our premier sponsors: Claw Concentrates, SHO Products/Rosin Tech, Advanced Nutrients, Coco Extracts, the Fire Station Wellness Center, Moxie, The Clear, FlavRx, Herbal Solutions and, of course, our gracious hosts at the Auto City Speedway. *Danny Danko*

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Michigan Cannabis Cup Winners

BEST INDICA FLOWER

1st Place: 9 Pound Hammer, by Double Dutch Farm Market/JD Farms

2nd Place: OGKB 2.0, by Herbal Solutions Ypsilanti with Mattybstackers

3rd Place: Peanutbutter Breath, by Mattybstackers with ThugPug Genetics

BEST SATIVA FLOWER

1st Place: Double Pucker, by Radicle Genetics

2nd Place: Sour Dubb, by Lake Effect in collaboration with OG Turtle Juice

3rd Place: Sunshine #4, by Treetop Therapy, Detroit

BEST HYBRID FLOWER

1st Place: Wedding Cake, by Herbal Solutions Ypsilanti with Loyalty Extracts and Superior Flowers

2nd Place: Cookies and Cream, by Mattybstackers with Exotic Genetix

3rd Place: Platinum Cookies, by Coco Extracts/Coco Family Farms

BEST EDIBLE

1st Place: White Chocolate Gingerbread Cake

Truffles, by Captain Kirk's Edibles of Depot Town

2nd Place: Zilla's Shortbread Cookie With Preserves, by Zilla's Performance Edibles

3rd Place: Orange Creamsicle Push Pop 50mg THC/50mg CBD, by Kozmic Gardens in collaboration with Radicle Genetics

BEST TOPICAL

1st Place: Michigan Organic Rub (Vanilla Mint), by Michigan Organic Rub/Herbal Solutions Ypsilanti

2nd Place: Ella CBD Body Butter, by Kozmic Gardens in collaboration with Radicle Genetics

3rd Place: CBD Living Freeze, by CBD Living

BEST CBD EDIBLE:

1st Place: Upside Down Pineapple Loud Stick, by Loud Sticks in collaboration with Full Spectrum Extracts

2nd Place: Smoked S'more, by Midnight Roots

3rd Place: Juana Pop Frozen Popcorn: Sweet Buns CBD, by Juana Pop with Dank Rapids and Claw Concentrates

BEST CBD FLOWER:

1st Place: Super Sonic CBD, by Radicle Genetics

2nd Place: Moose Cookies, by LightSky Farms

3rd Place: CannaGlue 4, by Full Spectrum Extracts

BEST CBD CONCENTRATE

1st Place: Star Tonic, by LightSky Farms

2nd Place: Oil Spill x ACDC, by Herbal Solutions Ypsilanti

3rd Place: Cannatonic & Super Lemon Haze, by Moxie MI and Maze Floriculture

BEST MEDICALLY INFUSED CANNABIS

1st Place: Medically Infused Product (Extreme Orange, Sunshine #4 distillate, Grease Monkey Kief), by Treetop Therapy, Detroit

2nd Place: Moon Rock, by Grateful Meds

3rd Place: GMOon Rocks, by Herbal Solutions Ypsilanti/Notorious THC Loyalty Extracts

BEST VAPE PEN CARTRIDGES

1st Place: Death Star, by LightSky Farms

2nd Place: Blueberry Elite Cartridge, by The Clear MI

3rd Place: Clearly Coco's Strawnana, by Coco Extracts

BEST NON-SOLVENT HASH

1st Place: Blackdog, by ICEExtract Equipment

2nd Place: AHHS Brand OG X Honey Bananas, by Pure West Compassion Club with Grumpy Bears Farms

3rd Place: GMO Live Resin, by Herbal Solutions Ypsilanti with Michigan Made Melts and Notorious THC

BEST INDICA CONCENTRATE

1st Place: Motorbreath Live Resin, by Herbal Solutions Ypsilanti with Higher Society Extracts

2nd Place: GMO, by Moxie MI and Dankemshunter

3rd Place: Northern Lights THCa, by DGExpress—Element Extractions

BEST SATIVA CONCENTRATE

1st Place: Strawberry Lemonade, by Moxie MI and Liberty Meds

2nd Place: Joplin Live Resin, by Herbal Solutions Ypsilanti

3rd Place: Tangie Ghost Train Haze THCa, by DGS Express—Element Extractions

BEST HYBRID CONCENTRATE

1st Place: Super Lemon Cookies, by Moxie MI

2nd Place: Strawberry Kush, by DGS Express—Element Extractions

3rd Place: Sour Tangie, by Lake Effect in collaboration with Pink Polar Bear

BEST BOOTH

1st Place: Herbal Solutions

2nd Place: Rosin Tech Products/SHO Products

3rd Place: The Fire Station Wellness Center

BEST GLASS

1st Place: Ghost Sho

2nd Place: Coco Extracts

3rd Place: Rosin Tech/Dab Nation

BEST VAPORIZER

1st Place: Ooze Duplex

BEST PRODUCT

1st Place: Banana Taffy, by Herbal Solutions Ypsilanti/Big Smokey Farms

2nd Place: Original Rosin Tech Filter Bags, by Rosin Tech Products

3rd Place: Orange Zkittlez Hippy Cigarettes, by Totally Herbal Care

BEST CHEF

Gigi from Cannabis Concepts

Cannabis Cup Canada Winners

BEST INDICA FLOWER

1st place: Cindy 99 by Rocky Mountain Kush

2nd Place: Master Kush by Endo Extractions

3rd place: London Bridge by The HerbcO

BEST SATIVA FLOWER

1st place: Sweet Jesus by Top Leaf

2nd Place: Ghost Train Haze by Rocky Mountain Kush

3rd place: Sour Amnesia by Buba Kings

BEST HYBRID FLOWER

1st place: Chocolate Kush by SWW Farms

2nd Place: Voodoo Child by Top Leaf

3rd place: Kraken by Beard Bros

BEST BOOTH

1st place: Rosin Tech

2nd place: Dabcor

3rd Place: Seven Star

BEST GLASS

1st place: Water Pipe with Dichroic by Lethal Glass and Evolution Glass

2nd Place: Papa's Pipes by DabNation

3rd Place: Bubbler by Gear Premium

BEST PRODUCT

1st place: Rosin Tech - The Original Rosin Tech Filter Bags

2nd Place: DabNation - Papa's Pipes

3rd Place: THC Alchemy Ice Cream by the Alchemy

BEST VAPORIZER

1st place: Pura Vida

2nd place: Dr. Dabber

3rd Place: Cannagold

BEST EDIBLES

1st place: Black Cube by Mota

2nd Place: Cotton Candy by Mota

3rd Place: Double Dose Milk Chocolate Peanut Butter Cup by Sweet Jane's

BEST TOPICALS

1st place: Buddha Bar by Miss Envy

2nd Place: Magik by Bare Coconut

3rd Place: Green Balm by Mota

BEST CBD EDIBLES

1st place: Lemon Cran CBD bites by Brio

2nd Place: High CBD Truffles by Dabcor

3rd Place: CBD Clear Sphere - Pineapple by Mota

BEST CBD FLOWER

1st place: BCCBD by Dr. Love

2nd Place: CBDutch Treat by Dr. Love

3rd Place: Auto Cheese by King Crop by Rocky Mountain Kush

BEST CBD CONCENTRATE

1st place: Syringe by Miss Envy

2nd Place: Chronic Distraction by Dabcor Happydabbers

3rd Place: Cannatonic Rosin by the Rosin Factory

BEST MEDICALLY INFUSED PRODUCT

1st place: Eye Drops by Optimal Rush

BEST VAPE CARTRIDGE

1st place: Sunset Gelato by Happy Sticks

2nd Place: Happy Hippy by Happy Sticks

3rd Place: Live Resin Death Babba by Diamond Concentrates

BEST NON-SOLVENT HASH

1st place: Pink Tangie by Diamond Concentrates

2nd Place: White Kush Flower Rosin by The Rosin Factory

3rd Place: Romulan by Destiny Biotech

BEST INDICA CONCENTRATE

1st place: Scout Master by Diamond Concentrates

2nd Place: R.S.K. by Puravida

3rd Place: Pink Star x Blue Monkey Live Resin by Diamond Concentrates

BEST SATIVA CONCENTRATE

1st place: Tropic Thunder by Puravida

2nd Place: Pineapple Tangie by Diamond Concentrates

3rd Place: Sweet Skunk by The Highve

BEST HYBRID CONCENTRATE

1st place: Space Cookies by Diamond Concentrates

2nd Place: Pineapple Lemon Kush by Puravida

3rd Place: White Widow by True North Canna



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Send your cannabis cultivation questions to [@deardanko](#) or [deardanko@hightimes.com](#).

SUBJECT: **Starting Seeds Outdoors**

FROM: **Gorilla Joe**

🌱 I want to plant seeds directly in my outside location instead of germinating them inside. Is this unwise, and can you give me any advice?

Dear GJ,

It's ideal to start your outdoor crop indoors, but if for some reason that's impossible, you absolutely can plant directly in your chosen location. Keep in mind that unless you're using feminized seeds, you'll still have to return at least once to remove the males before they mature. Also, remember that young seedlings can be easily damaged by exposure to the elements early on in life. On the plus side, any plants that survive are sure to be hardy and well acclimated to their location.

Plant more seeds that you expect to grow out fully and water them well. Sounds to me like you can't regularly visit your chosen location, so be sure to bring water and organic fertilizer whenever you find the opportunity (and especially if there's been no rain for over a week).

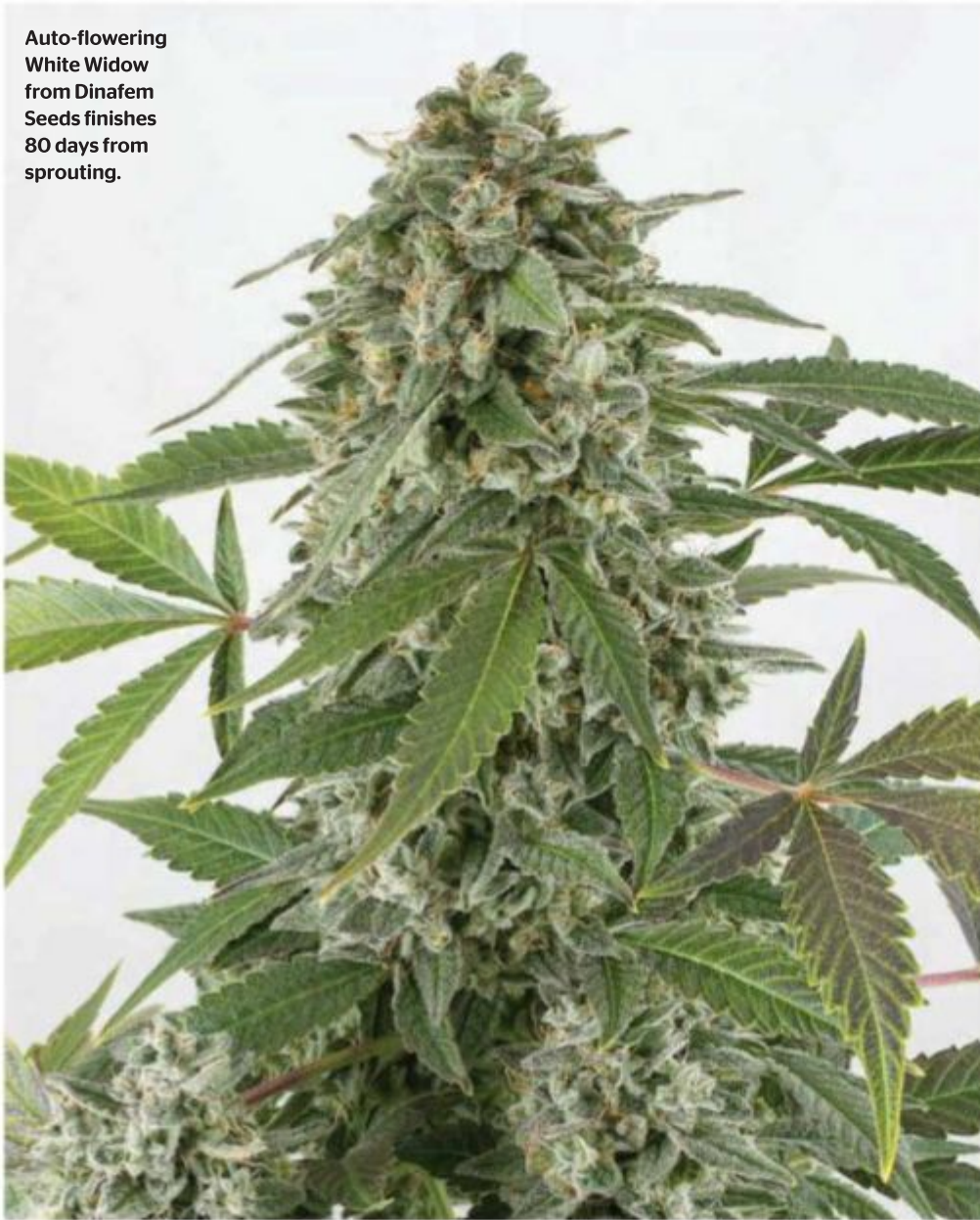
If you choose to start your plants indoors, the benefits are plentiful. Seedlings can be started while it's still winter outside and vegetated into nice-size bushes before it's warm enough for them to go out. You can use oscillating fans to imitate the wind in order to strengthen the young shoots and prepare them for life in the wild. Stronger plants mean bigger yields.

A healthy start is essential to future success.



Danko Tip: If you constantly have trouble with your tap water, invest in a reverse-osmosis (RO) machine to remove impurities.

Auto-flowering White Widow from Dinafem Seeds finishes 80 days from sprouting.



SUBJECT: Auto-Flowering Mother Plant
FROM: Preecha

Hi, I have three Blueberry mothers (three months old) that are growing well and have provided me with several clones. The problem is that one of the females doesn't want to stay in the vegetative state despite receiving 20 hours of light per day. She's in full bloom and it's difficult for me to clone her because of the many buds and not enough stem and leaves. Even her clones don't want to grow. They just sit at about 4 to 5 inches tall and then bloom regardless of the light cycle. The daytime temperature is quite low, at 65 to 75°F, with 45 to 55 percent humidity. My two other Blueberry and two Kali Mist mother plants are doing well, however, and they're all at about 3 feet tall. What should I do?

Dear Preecha,
Your auto-flowering mother plant is pretty much worthless. Let her finish flowering and focus on maintaining the health of your remaining mother plants. The problem is that she and any clones you manage to take from her will revert to the flowering stage no matter what the light situation. This is why auto-flowering plants are grown from seeds.

Clones taken from any flowering plant will have a difficult and strenuous time switching back to the vegetative state, but clones taken from an auto-flowering plant almost never do. The only thing you could potentially do with your plant is to try to breed with it, but even that is probably best left to the experts. Be thankful for your four other normal mother plants, and take clones from those to your heart's content.

SUBJECT: Crowding Strains

FROM: Fish

Hello, I'm a first-time grower planning out for a cannabis cultivation cycle in the near future. My plan is to use a small and simple hydroponic system. My question is this: Can I grow three or four different strains in my system close together? What can happen?

Dear Fish,

What you are attempting to do is difficult, especially for a first-time grower. You can have several strains in the same unit, but you need to keep a few things in mind. First of all, strains have different growth traits—some will grow taller more quickly, and some will branch out more than others. Also, different strains require different amounts of nutrients, so it can be hard to dial in a perfect formula for all of them at the same time in the same reservoir.

If you still plan to try this course of action, try to get strains that act similarly, such as three *indicas* or three *sativas* with flowering times that correspond to each other. Otherwise, grow the plants separately in buckets using either soil-less mix or a deep-water culture (DWC) setup in which each plant is held in its own container.

SUBJECT: Curling Leaves

FROM: Canadian Bakin'

I recently fed my plants some nutrient solution, and now the leaves are curling downward and starting to become brittle. The tips are brown and crumbly, and the leaves look like they are trying to literally curl up into themselves. What did I do?

Dear CB,

Sounds like a classic case of overfeeding to me. I think you used too much fertilizer in your last watering, and the plants are responding to high levels of salts in the root zone by curling up and browning from the tips of the leaves inward.

Flush your plants with plenty of plain pH-balanced water until it flows freely out of the bottom of your pots. When you resume feeding, do so at half of the recommended dosage and see what happens. Forget about the old burnt and curled leaves and focus on the new



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- 25 ton hydraulic ram.
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- 4 x 250 Watt heaters. (1000 watts.)
- 10" x 5" 6061 Alum. Blocks.
- 18"W x 11"L x 21"H.
- 170 lbs.

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Danko Tip: Yellowing leaves are a sign of underfeeding or a pH imbalance, while burnt leaf tips are a sign of overfertilization.

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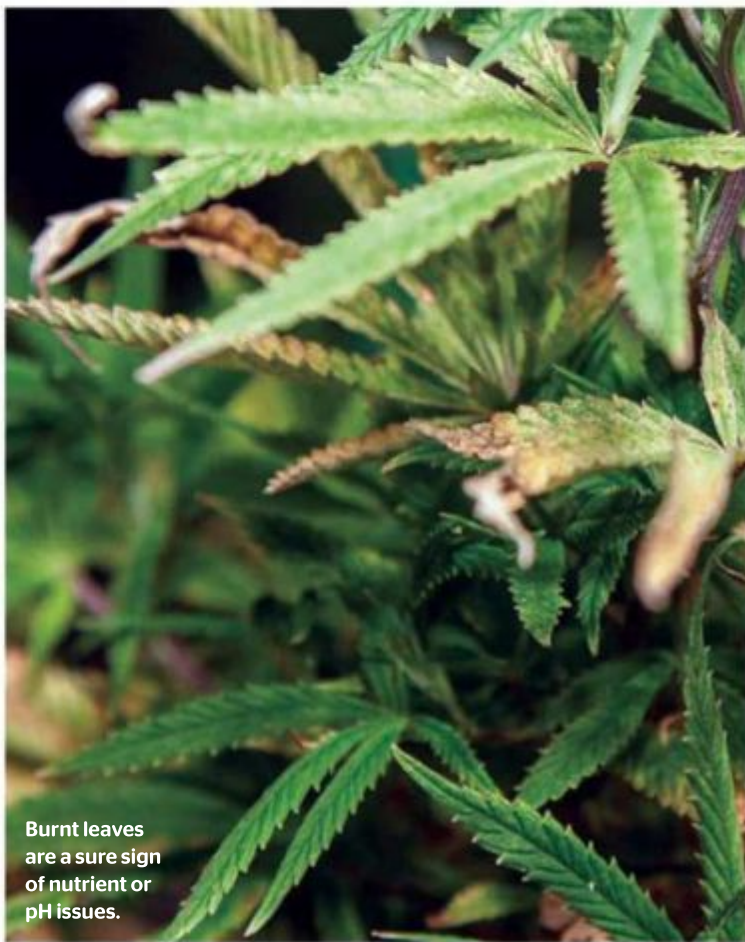
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growth. If the new shoots look healthy, you've eliminated the toxic levels of ferts and can continue with your growth. If not, try flushing the plants again with even more water in case there's still a buildup in your pots.



SUBJECT: Drooping Leaves in Hydro

FROM: Weeping Willie

I recently transplanted my vegging plants into my flowering hydroponic unit, and the leaves immediately began to droop. Now they are all drooping drastically, and some of the plants have even died! My pH level is 5.0 to 5.5. The temperature of the water in my reservoir is around 80°F and the air temperature is around 80 to 85°F. Relative humidity is stable at 55 to 65 percent. What is the problem?

Dear WW,
My initial diagnosis of your problem is that your pH is a bit low and the temperature of the nutrient solution is too high. As water temps rise, the amount of dissolved oxygen decreases. Your plants' roots are too hot and gasping for air, and the leaves are responding by drooping. The lower pH level adds to your woes, as some nutrients are locked out completely.

Use pH Up to raise your pH to 6.0 and lower the temperature of your nutrient solution to between 60 and 70°F. This can be done best with a reservoir chiller, but cheaper ways include freezing a 2-liter bottle full of water and placing it in your reservoir. Keep in mind that this is a very temporary solution to a continuous problem. Raise the oxygen level in your reservoir by using an air pump and air stones as well.

NITRO



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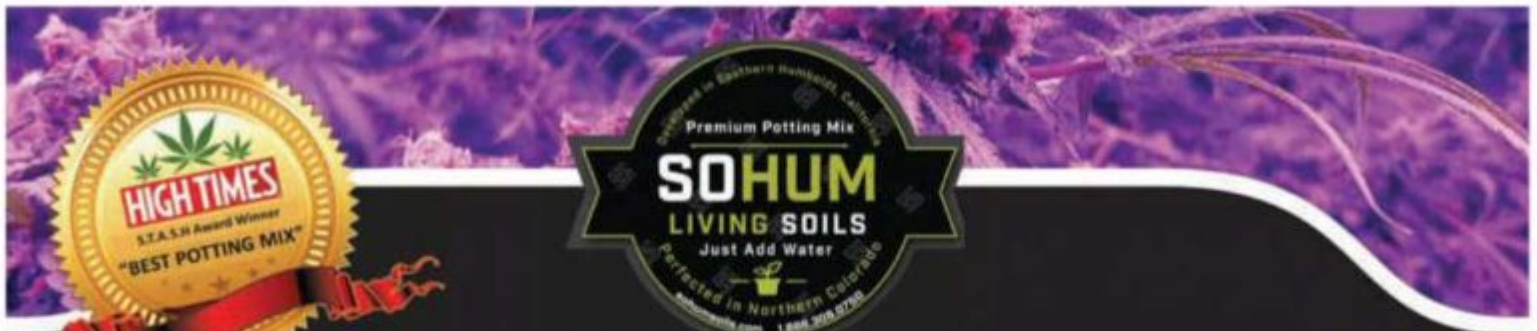
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Danko Tip: Every bend or sag in your ducting slows down airflow, so keep it as straight as possible.

SUBJECT: **Plants Falling Down**

FROM: **Tennessee Jed**

🌱 Help! Something is killing my young outdoor seedlings and transplants. They're fine when I go to sleep, but when I wake up I find them either dead or almost falling down. Something is chewing the stems at the base of the plants. I've noticed marks and some kind of little gray worms near the base as well. Could they be the problem? Please solve my dilemma.

Dear TJ,

The worms you noticed are precisely your problem. They are known as cutworms, and they behave in exactly the way you have stated. Cutworms are actually moth larvae, and they hide in the soil during the day and wreak havoc after dark. In one night, one cutworm can sever the stems of several plants.

Now that you've diagnosed the problem, you have to act quickly to avoid losing any more young plants to this menace. First, apply the dry biological control known as BT, or *Bacillus thuringiensis*, to the soil around the base of your plants. Totally organic, this powder will paralyze the intestinal tracts of the soil-based larvae after they start to feed. Several widely available parasites attack and control cutworm populations. Mail-order some of these beneficial nematodes and put them to work for you.

You can also create cutworm collars for the base of your plants to prevent these pests from reaching their meal. Use cardboard tubes from paper towels or milk cartons and cut them so that they are at least 2 inches high around the base of the plant and firmly stuck into the soil. This should discourage the cutworms from choosing your sensi stalks for their meal.

SUBJECT: **Foliar Feeding**

FROM: **Stone Free**

🌱 My buddy and I have a bet going. He swears by foliar feeding, while I think it invites mold and clogs up the plants' pores. Which of us is right?

Dear SF,

Sorry to say but your buddy is correct. When performed properly and at the right times, foliar feeding produces healthier and stronger plants. Foliar feeding is the process of spraying a mild nutrient solution directly onto a plant's leaves. Through their stomata, leaves are able to absorb water and food, and foliar feeding also has the added benefit of cleaning the leaves of any dust or particles that can block out light.

Foliar feeding should only be performed during the vegetative stage. Spraying forming buds during flowering will encourage moisture buildup that can lead to mold and rot. Also, be sure to spray only early in the "day" or light cycle so that moisture has time to be absorbed or evaporate before darkness comes.

I particularly recommend foliar feeding with compost tea for outdoor plants. The many organisms present in the extract feed and protect the plants like nothing else, and it's almost impossible to go overboard and burn the plants. Be sure to spray both the tops and the undersides of the leaves, applying liberally. ✨

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HIGH TIMES

2016 S.T.A.S.H. AWARDS

OUR PICKS FOR GEAR OF THE YEAR

The High Times Cultivation Department is constantly on the lookout for new innovations in marijuana-farming technology. Each year, we reveal the latest and greatest grow gear as part of our Significant Technological Achievements in Secretive Horticulture (or S.T.A.S.H.) Awards.



Best Power Trimmer

Ultra Trimmer

The best trim job results from the least amount of contact with the blades. The Ultra Trimmer can process six pounds of product every twenty minutes without destroying the trichomes. With no violent tumbling that can break off gland heads, these units quickly and carefully trim off all extraneous leaf matter. The Collective unit does about 2-3 pounds per hour while the Industrial Deck can process 8-10 pounds per hour with four people working it.

\$4000 Collective Unit \$8000 Industrial Unit

ultratrimmer.com



1



2



3



4



Hot Products

What's new for cannabis cultivators and connoisseurs

1 Head Jar

Starting at \$49
smokusfocus.com

Storing your cannabis in plastic baggies just doesn't cut it these days. That's why we love the new selection of jars from Smokus Focus that keeps your buds sealed in an airtight container. With three sizes to choose from, these jars feature rechargeable LED bulbs and magnification lenses in their lids so that you can properly examine and display your precious nuggets for all to see, up close and personal.

2 Spray It

\$29.95, 100 ml.; \$69.95, 250 ml.
foliaressence.com

Spraying the leaves will raise your plants' immunity to mold and disease and also keep them clean and free of dust and other particles. Ultra-concentrated Foliar Essence provides an organic and vegan mist that will defend your garden and increase your yields significantly. Spray during the vegetative stage to boost growth and during the flowering stage to maximize essential-oil production, bud formation and terpene preservation.

3 Power Poop

\$45, 250 ml.; \$75, 500 ml.;
\$130, 1 liter

fishheadfarms.com

Smart farmers have been feeding their plants fish waste since the start of agriculture. Rich in beneficial bacteria and many microorganisms, Fish Sh!t Soil Conditioner improves the biology and rhizosphere of your root zone for bigger yields of flavorful buds. After tilapia digest a proprietary feed blend, they produce this special product that's OMRI-listed, safe to use and odor-free.

4 Essential Oil

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mygreenplanet.com

As pot growers, we're interested in the production of the cannabinoids, flavinoids and terpenes that give our flowers their scents, flavors and potency. Green Planet's Rezin increases these factors without the use of plant-growth regulators (PGRs) or other harmful bio-stimulators. Rezin also won't impact the ppm/EC of your nutrient solution, so you can run your base nutes at full strength while improving aroma, taste and power.

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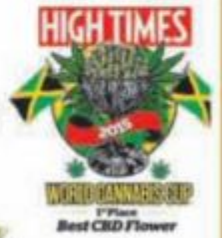
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Edibles



Marijuana munchies made easy!



Hashy Holiday Brie and Pear Tart

Special occasions call for luxurious edibles to celebrate the season!

By Chef Gabriel Reeves

Sophisticated and elegant enough to feature on your holiday table, this Brie and pear tart seamlessly blends the taste of cannabis into rich, creamy cheese and juicy fall fruit. Incredibly simple to make, this dessert is sure to impress your friends with its seasonal flavor and hard-hitting THC potency!

Made as described, each slice of this tart contains about 50 milligrams of THC, so be sure to reduce the amount of cannabis if you'd like a less potent dessert. The final dosage will vary based on the THC content of your starting material, as always. Always keep in mind that edibles take two hours for their effects to be felt, and new users should not consume more than 10 mg of THC.

This delicious cannabis treat is based on Sommer Collier's outstanding recipe at A Spicy Perspective, so a big *High Times* shout-out to her and aspicyperspective.com!

INGREDIENTS

1 refrigerated piecrust
3 to 4 ripe pears
8 oz. Brie cheese
¼ cup brown sugar or honey
1½ oz. cannabis- or hash-infused liquor*

*You can use kief or hash to make your own tincture. Simply take 1 gram of kief or hash, place it in a Pyrex dish and bake it at 250°F for 15 minutes. Then add 2 ounces of your favorite liquor to suspend the cannabis into a solution.

DIRECTIONS

Preheat the oven to 400°F. Roll out the piecrust and carefully press it into the tart pan (make sure not to stretch it). Fold the

overhanging excess dough inward and press into the ridges of the pan.

Cut the Brie into thin strips and place on top of the piecrust in the tart pan. Make sure to press the cheese in evenly.

Cut the pears into very thin slices (the thinner the better). Arrange them in a circular overlapping pattern around the outer edge of the tart pan, leaving a hole in the middle of the tart.

Stand the slices up and press them into the Brie in the shape of a rose. Continue to bend and overlap the pear slices all the way to the center.

Thoroughly mix the brown sugar and infused liquor in a small bowl. Sprinkle the mixture evenly over the top of the pears and then dash with salt.

Bake for 30 to 40 minutes until the crust is golden.

Let the tart rest for 10 minutes before removing it from the pan and cutting into portions. ✨

Chef Gabriel Reeves is an experienced edibles educator. Follow Gabe on Instagram at @gabrielcooksfood.

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Give Pot a Chance

THCa, interventions, bogus studies and aggression

Got a question for Dr. Mitch? Email him at 420research@gmail.com.

I see a lot of THCa products. What do they do?

Ernest Import

Hi Ernest, THCa (tetrahydrocannabinolic acid) is common in undried cannabis plants and turns into THC in the presence of heat. Rodent and petri-dish experiments suggest it's an antioxidant, protector of neurons and fighter of cancer, but human studies are few. I'm sure it won't hurt anyone, but I couldn't guess what to expect or what doses would be helpful.

My brother got busted for smoking pot in his dorm and had to do an online "intervention." Do these things even work?

Doubting Thomas

Yo DT, Nope. If your brother had some genuine problems related to the plant, he might find himself thinking about using smaller amounts, less often and later in the evening. He might also end up taking a look at his cannabis budget, but that's about it! Sounds like prohibition is the problem, not your brother.

A new study said CBD did NOT help Crohn's disease. I swear to you it works.

Ima Believer

Hello Ima, The study you mention had only 19 participants and they only took 10 milligrams of CBD a day. Please ignore it. No medicine can work if you don't have enough of it.



Mellow out, man!

I'm in an argument about marijuana and aggression. HELP!

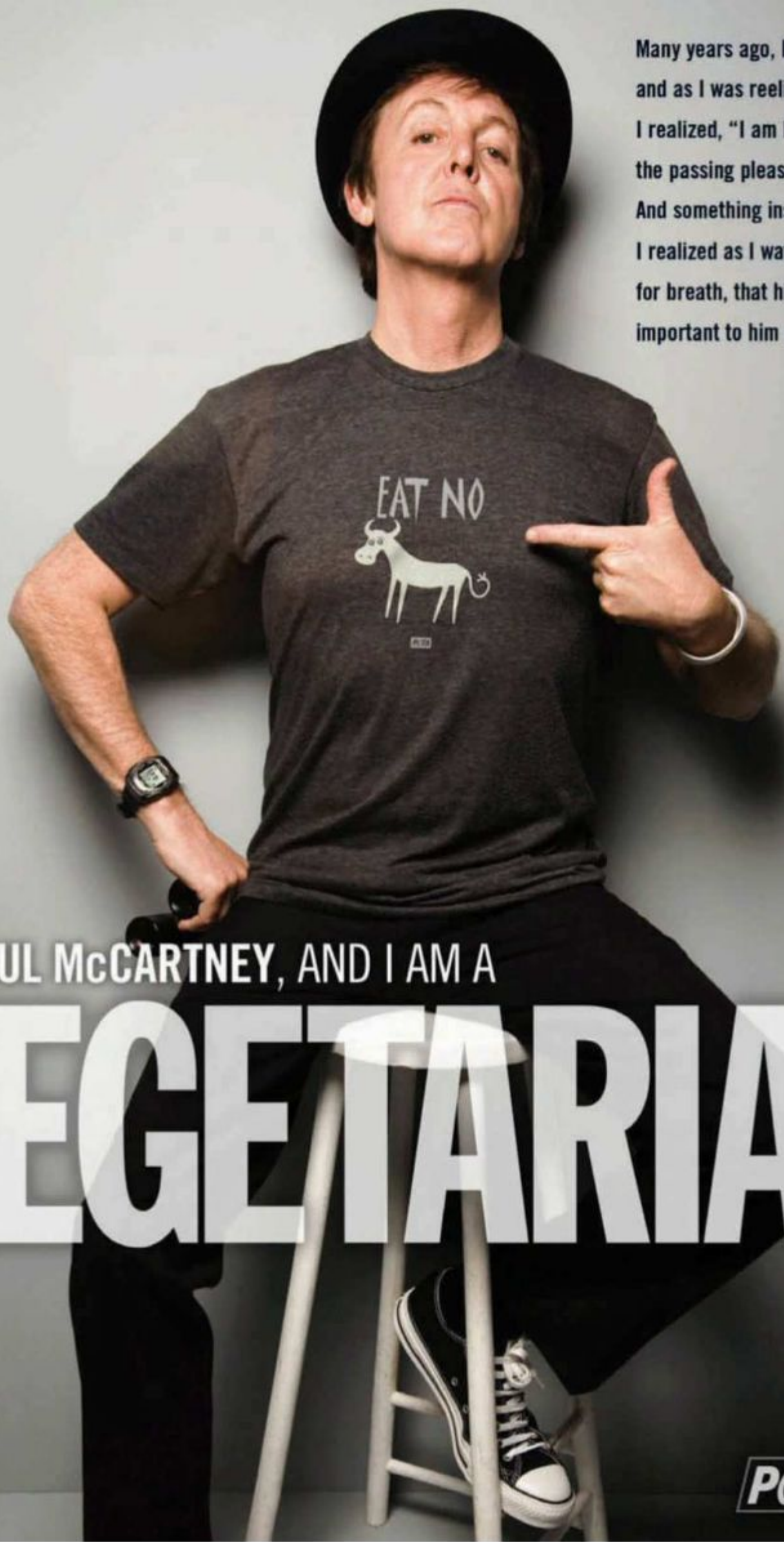
Billy Jack

Hey Billy, Results are clear. One study of alleged marijuana withdrawal suggested folks play a game in a mean way if they don't have the cannabis that they've become accustomed to having every day, but they were only meaner at one of the measured times. It was probably a statistical fluke. Experiments consistently show that the placebo group is meaner than the group that gets cannabis. (I bet they were bummed about getting a placebo.) Any link between marijuana and aggression in correlational studies actually stems from alcohol use. Let's hope this myth joins the dinosaurs soon. 🌿

Dr. Mitch Earleywine, PhD, is the author of Understanding Marijuana and The Parents' Guide to Marijuana.

Photo © 2007 PETA Communications Ltd./Alan Kobayashi

Many years ago, I was fishing,
and as I was reeling in the poor fish,
I realized, "I am killing him—all for
the passing pleasure it brings me."
And something inside me clicked.
I realized as I watched him fight
for breath, that his life was as
important to him as mine is to me.



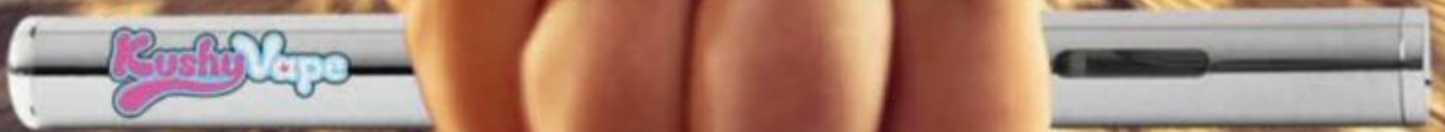
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No Cannabis on Campus

Despite legalization efforts, colleges continue to ban marijuana use, forcing students to give up their medicine or face disciplinary action.

Clare Sausen is junior associate of NORML. Visit norml.org.

WHAT'S A MEDICAL-MARIJUANA-CARD-HOLDING college student to do when they are required to live in on-campus housing but their medicine is banned from the premises? According to most university policies, they're forced to choose between suffering or facing disciplinary action.

In Washington, DC, marijuana is legal for those over 21 to possess, transfer (exchange with no money involved) and grow (up to two ounces of cannabis in their homes). Medical marijuana is also available for purchase from a dispensary with a doctor's recommendation. However, DC's progressive pot policies haven't matriculated to college campuses in the area yet.

For example, at American University, the code for student conduct includes the following as punishable offenses for "alcohol and illegal drugs":

- To use or possess any illegal drug (including medical marijuana) or drug paraphernalia in the residence halls.
- To sell, manufacture or distribute any illegal drug (including medical marijuana) or drug paraphernalia in the residence halls.
- To knowingly and voluntarily be in the presence of any illegal drug (including medical marijuana) or drug

paraphernalia in the residence halls.

At George Washington University, the policy on medical marijuana is less clear, as it's not listed in the code for student conduct. When asked for clarification on the matter, the administration declined to respond.

However, the school's code for student conduct does say that students caught using, possessing or distributing marijuana face a minimum \$50 fine, mandatory drug-education classes and possible eviction from housing. If there is intent to distribute, students face suspension or expulsion.

Alcohol penalties at the school, on the other hand, are significantly less harsh. The penalty for alcohol consumption or possession is parental notification, and for subsequent offenses, students could face a possible fine or mandatory enrollment in alcohol-education classes.

In addition to this, GWU provides an Alcohol Medical Amnesty Policy, wherein underage intoxicated students can receive a penalty-free ride to the hospital in a student-run ambulance for their first offense. Each subsequent transgression is subject to increasingly harsher penalties, though

DC's progressive pot policies haven't matriculated to college campuses in the area yet.

it takes much longer for a student to earn serious disciplinary action for alcohol consumption than for marijuana use, as cannabis users are severely penalized for their first offense.

So why do these schools remain so behind the times? Why is marijuana use treated so much more punitively than alcohol, which kills over 1,800 students per year and is heavily associated with sexual assault? Like most decisions colleges make, it all comes down to funding.

According to the Drug-Free Schools and Communities Act of 1989, the use of "drugs" (a vague term that somehow excludes alcohol) must be prohibited by schools, universities and colleges. If they fail to comply, they become ineligible for federal funding.

While marijuana-law reform has certainly come a long way in the last decade, the sad truth is that many people—including students in the nation's capital—continue to face harsh and outdated penalties for using cannabis. Until policy catches up to public opinion, students in DC will have to choose between medicating and following their school's code of conduct. 🌿

FREEDOM FIGHTER

By Kevin Mahmalji, NORML national outreach coordinator

Be the Change

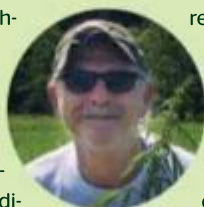
Jeff Riedy is a force in the Keystone State.

Jeff Riedy became aware of NORML back in the '70s after reading about the activist group in *Rolling Stone* magazine. But back then, he wasn't politically involved. It wasn't until years later that he finally realized that "you cannot complain if you have not first made an effort to effect change." Since then, 20 years ago, Riedy has actively volunteered in each presidential race, honing his skills for activism.

Then, three years ago, he

learned about the establishment of a local NORML chapter. "Attending that first meeting was like a revelation for me," Riedy said. It was 2014 and Pennsylvania was debating medical marijuana, so Riedy rolled up his sleeves and dug in, fighting side by side with advocates and patients. In April 2016, Pennsylvania passed a medical-cannabis bill.

After a brief hiatus, Riedy took the reins of his local chapter, becoming executive director of Lehigh Valley NORML. Since then, he and two original board members have



reignited the chapter. Their first idea was a local 4/20 March.

But, as a relatively new organization, LV NORML was penniless. So Riedy personally financed the event's promotion. The 4/20

March in Easton was a big success, drawing more than 100 people and proving to Riedy that Lehigh Valley was ready to push for reform.

Riedy has rebuilt his chapter's board of directors and worked closely with the many cannabis-related nonprofits in Pennsylvania. He's forged strong relationships with supportive politicians, focusing

not only on local efforts, but also on reform throughout the state.

Anticipating an early 2018 rollout of Pennsylvania's Medical Marijuana Act, Riedy realized that doctor enrollment was sluggish, as many were reluctant to participate. So he and LV NORML started coordinating local town halls to help inform patients and physicians.

Looking forward, Riedy has big plans for his little chapter. Representing Allentown, Bethlehem and Easton, PA, the Lehigh Valley NORML chapter is pushing for decriminalization locally while thinking about legalization nationwide!

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continued from page 98

Q&A with EZ-Clone

What inspired the original EZ-Clone design? Why aeroponics?

As we began to learn more about hydroponics and how it could lead to faster growth rates, all the literature and the most incredible photos we came across showed aeroponics as the “super-charged” model for growing plants. So, we started to experiment.

What are some of the biggest challenges EZ-Clone faces as more states come on board with medical and recreational legalization laws?

Keeping up with the demand used to be a major challenge, but we have put solid manufacturing processes in place to get ready for the increase that's coming. Also, with different states having different laws that are always changing, the needs of those producing cuttings are always evolving. For example, where there are large licensed producers, our Commercial System is a great fit. However, in a market that supports smaller home-based cultivation, we need to offer the same level of technology, but on a scale and price point that is very different.

What's the fastest you've ever heard of cannabis cuttings rooting in one of your systems?

We grew our own strain dubbed “Maui,” and it rooted fast! In our early EZ-Clone systems, we would see callous tissue forming on the cut stems in less than 48 hours after planting and would see new roots developing on the third or fourth day, consistently.

You guys have been business partners for over 16 years, and friends for even longer. That's longer than most marriages, statistically speaking—what's your secret to a long and successful business partnership?

We are polar opposites, and it seems to work well with us. Our relationship has evolved, as we have, learning and growing in the business world. Acknowledging



EZ Clone first began to appear in High Times over 16 years ago!

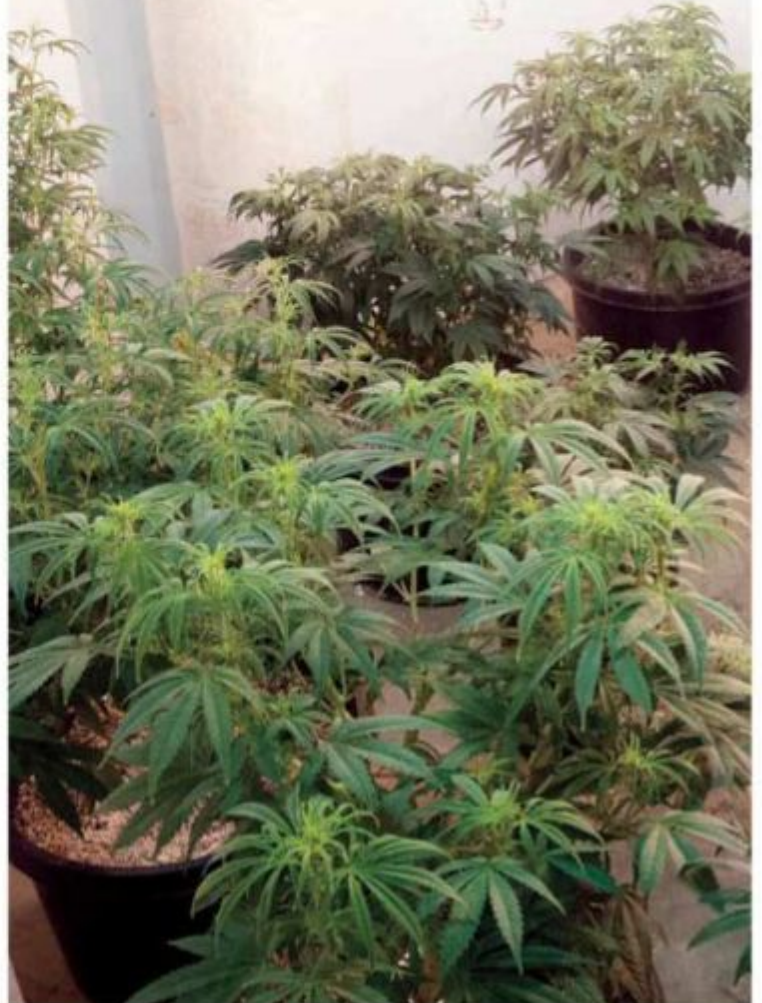
each other's strengths and helping one another to grow those areas for the benefit of our business was an important and fundamental starting point. We'd be lying if we said we hadn't clashed from time to time, though—in the end, each of us does a good job of remembering what is best for the business and to put our egos aside.

What keeps you motivated to continue innovating? The Commercial System appears to show that you are not resting on your laurels, that it's a big, new step forward.

We love what we do! You might hear it a lot from others, but we really mean it when both of us tell you that we really feel satisfied helping other growers. Seriously, it's where we got our name from starting out—folks who couldn't pop roots with much success would come back to us all excited and say how easy we made it for them. We still love getting those calls and emails today. It's a very exciting time to be a part of this industry, and we are looking forward to many more years of growing and evolving with the needs of cannabis growers.

We'd also like to send out a very sincere thank-you to *High Times* magazine and the entire crew, past and present. *High Times* and their awesome staff gave us huge support in the very beginning, starting our company from the garage floor, and EZ-Clone would certainly not be where it is today without the graciousness and assistance of everyone involved. ✨

Cloning from a variety of cannabis strains offers diversity for both crop yields and harvest qualities.



Five Master Aeroponic Cloning Tips

- The quality of clones is in direct relation to the quality of the mother/donor plant. Keep mother plants as healthy as possible and free of insects and airborne fungi.
- While filling a unit with cuttings, apply rooting gel directly to each cut stem, allowing extra time for the gel to completely absorb into the plant tissue until the lid is full of cloning collars. Then turn on the water pump. If any wilting occurred, the plants will pop back very quickly.
- Cuttings only require enough light to help sustain themselves upright. Minimum-wattage bulbs work perfectly for propagation. Save the energy and high-powered lights for after the cuttings have developed roots and are transplanted.
- Contrary to popular belief, we have seen better root development with warmer water temperatures. The target area should be 75°F to 85°F. Make sure to use an anti-pathogen additive, such as EZ-Clone's Clear Rez, to prevent any bad bacteria from forming in the reservoir.
- Keep it simple and don't overthink. It's called EZ-Clone for a reason. Follow the instructions and let the system do the work. Make sure to follow proper cleaning instructions in between cloning cycles. This is imperative for achieving the best results.

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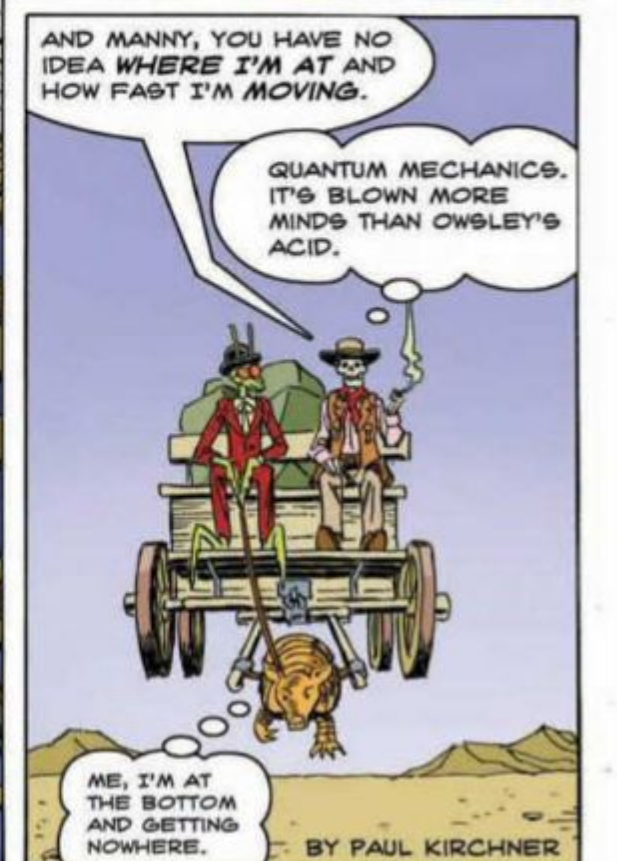
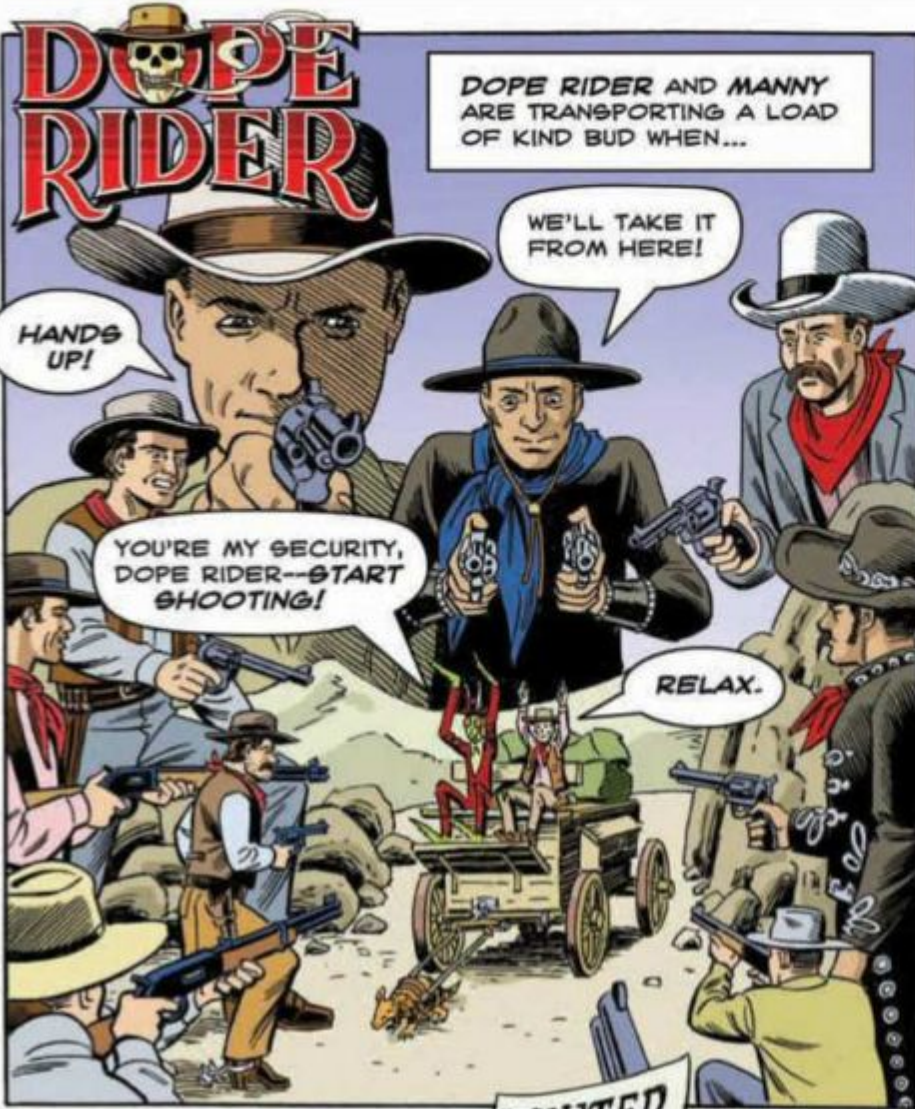


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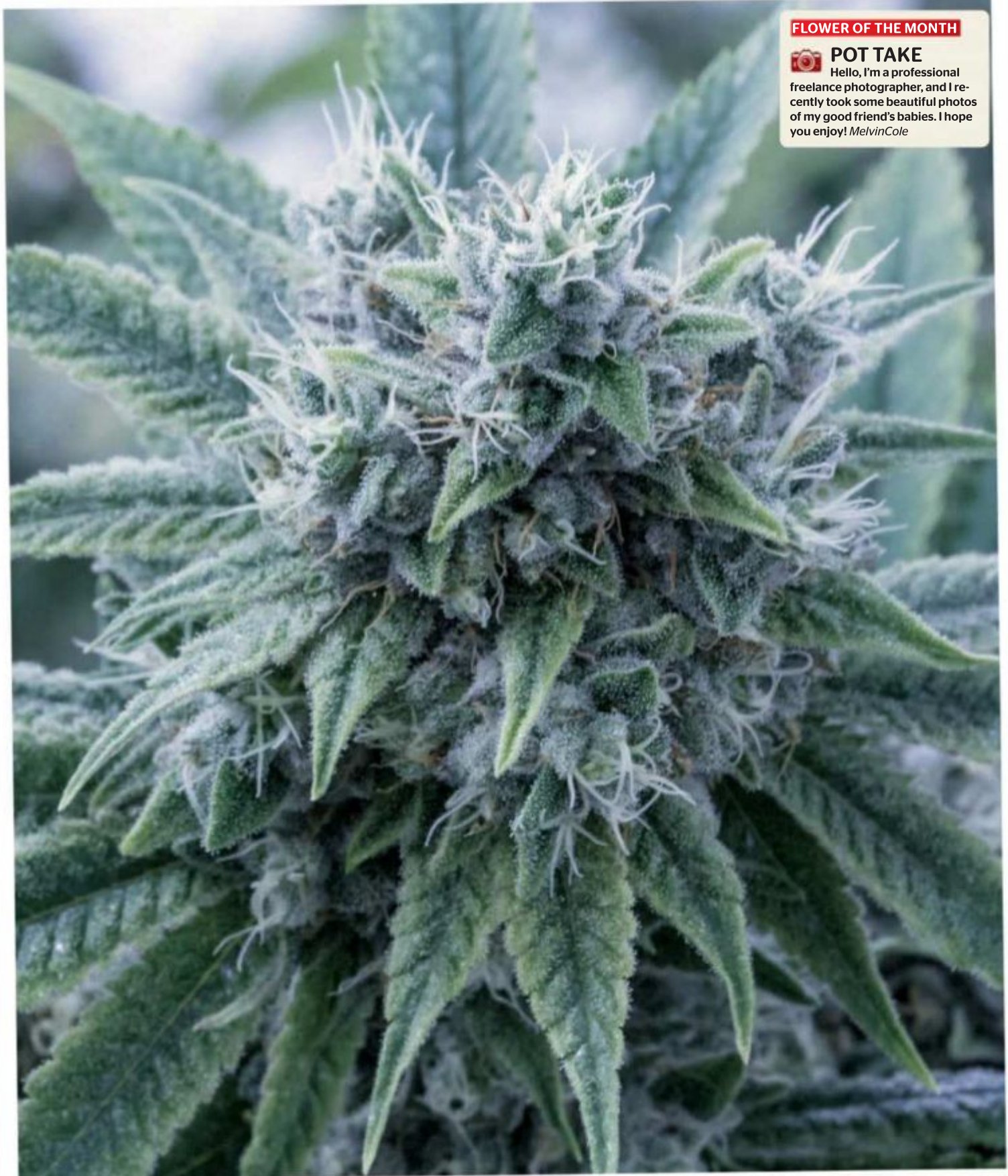
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FLOWER OF THE MONTH



POT TAKE

Hello, I'm a professional freelance photographer, and I recently took some beautiful photos of my good friend's babies. I hope you enjoy! *MelvinCole*

Featured Products



HIGH TIMES Cultivation Editors' Combo Pack
Set includes Jorge Cervantes' *Ultimate Grow Box Set*, Nico Escondido's *Grow Like a Pro*, and Danny Danko's *Field Guide to Marijuana Strains*. An \$85 value for only **\$69.99!**



HIGH TIMES Presents Nico Escondido's *Grow Like a Pro* DVD
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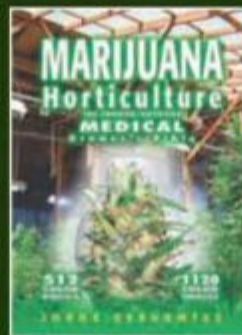


Back Issues of HIGH TIMES
Lots of issues available! HIGH TIMES: **\$5.99**; Best Of HIGH TIMES: **\$6.99**; HIGH TIMES: Medical Marijuana: **\$5.99**

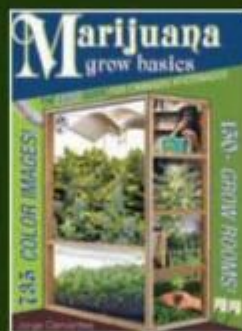
Classics from master grower Jorge Cervantes



Ultimate Grow DVD Complete Box Set
Three-disc DVD box set includes *Ultimate Grow: Indoor Marijuana Horticulture*, and *Ultimate Grow 2: Hydroponic Cannabis Indoors & Organic Marijuana Outdoors*. Plus a full disc of bonus features! **\$49.95**

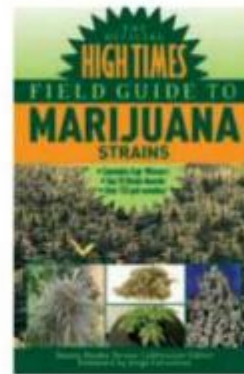


Marijuana Horticulture
The Fifth Edition of Jorge Cervantes' best-selling book, completely rewritten, updated and expanded! **\$29.95**



Marijuana Grow Basics
This informative guide is packed with illustrations and photos of more than 150 affordable marijuana grow setups. **\$21.95**

High Times Books



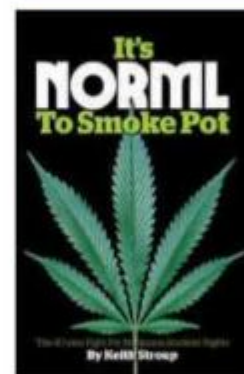
The Official HIGH TIMES Field Guide to Marijuana Strains
By Danny Danko
This cannabis compendium covers the world's top pot varieties—all meticulously researched and lovingly described in terms ranging from odors and flavors to potency levels and medicinal properties. **\$14.95**



The Official HIGH TIMES Cannabis Cookbook
by Elise McDonough
Go way beyond the brownie and master your munchies with over 50 recipes for stoner cuisine that will get you high—including recipes inspired by Cheech and Chong, Snoop Dogg and Willie Nelson. **\$19.95**



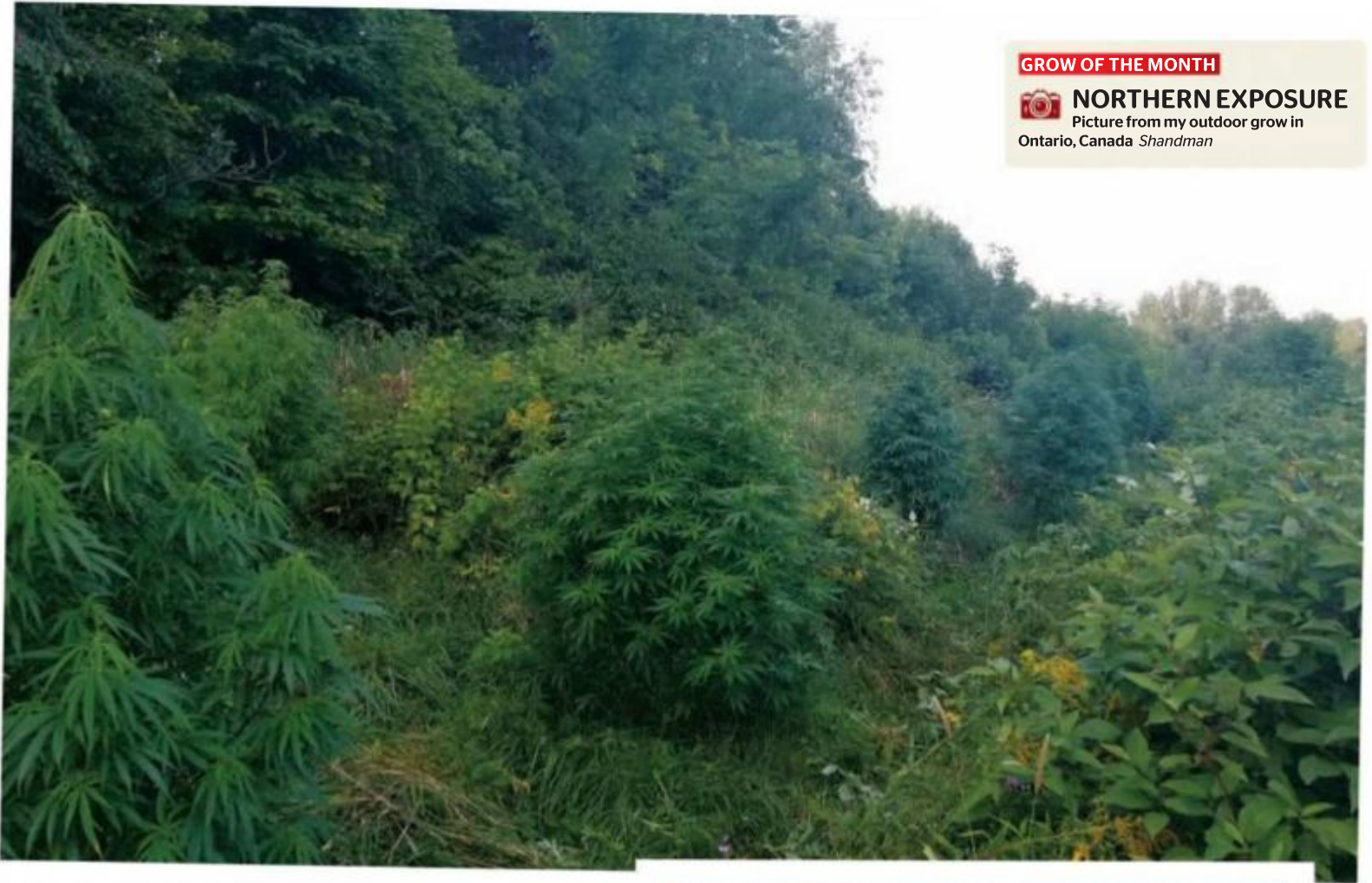
The Official HIGH TIMES Pot Smoker's Handbook
by David Bienenstock
This handbook rolls up all of our collected wisdom into one indispensable ganja guide. With a life-changing list of 420 things to do when you're stoned, this is truly the ultimate guide to green living. **\$19.95**



It's NORML To Smoke Pot: The 40-Year Fight For Marijuana Smokers' Rights
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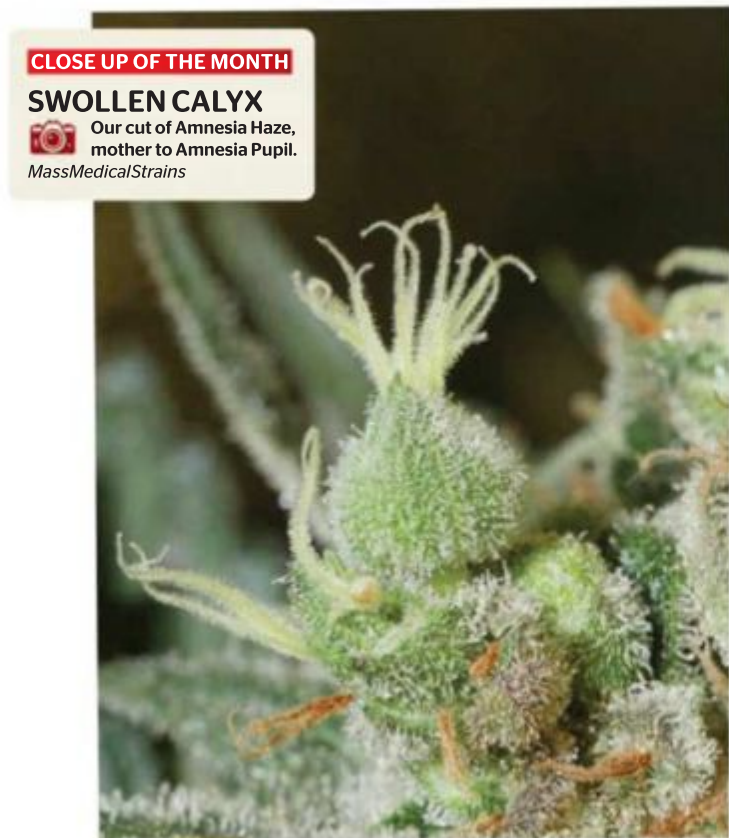


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Picture from my outdoor grow in Ontario, Canada *Shandman*



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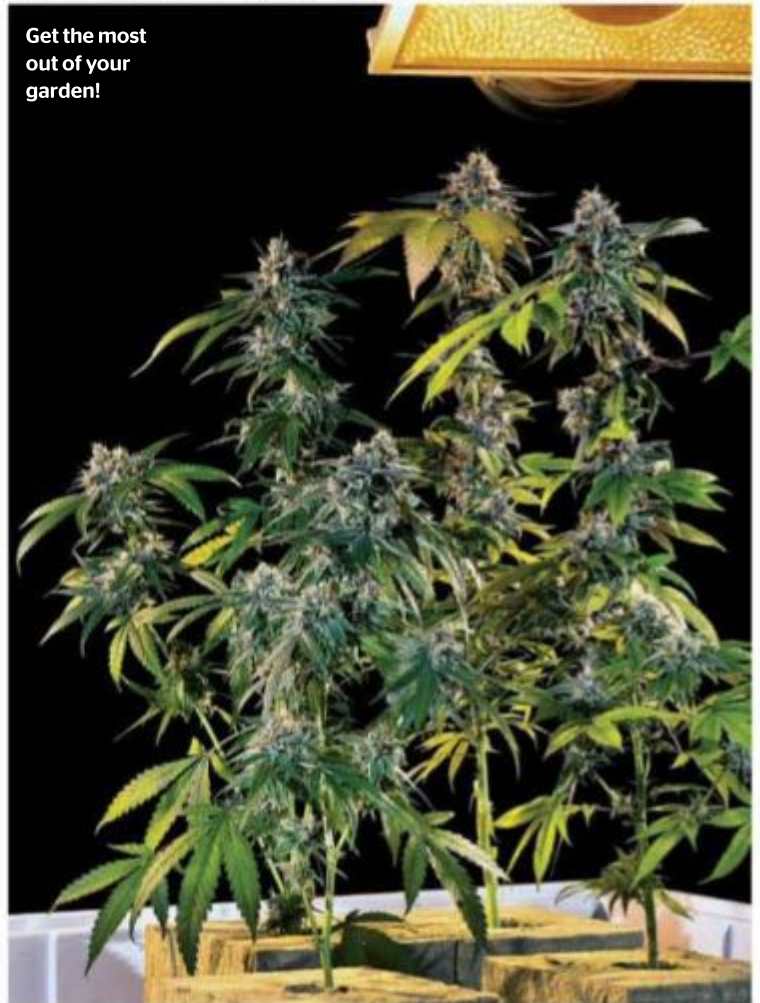
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2018 Hydro Report

Cultivating cannabis without soil results in explosive growth rates and heavy harvests. The *High Times* cultivation department reports on the latest hydroponic techniques and new equipment to increase yields and grow bigger and better buds.

Vape Pen Review

Our annual feature is here to help you decide on the best vaporizer pen for concentrates in a variety of categories. We assess over 60 pens for stealth and health, smooth hits, terpy goodness, good design, affordability and more.

Daytime Highs

In the age of soaring THC percentages, some smokers are seeking out low-THC strains. We investigate the makeup and merits of low-THC cannabis and the role of CBD in our "Daytime Highs" report.

Opportunities Knock

The legal cannabis space has opened a world of potential for many entrepreneurs, yet people of color face a gauntlet of obstacles that bar entry into the game. We investigate the issues behind minority exclusion and hear from the activists fighting for justice and equal opportunity in the green revolution.

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Interviews with expert growers and professional seed breeders. 'Strain of the Week' and ganja frowing questions & answers.



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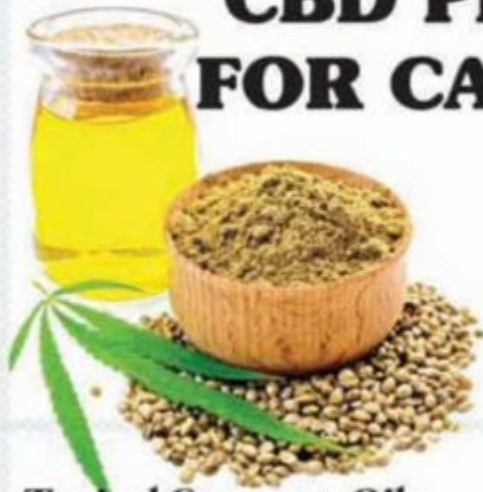
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CBD PRODUCTS SPELL PROFITS FOR CANNABIS ENTREPRENEURS



High Times Readers have known about the benefits of cannabinoids for years, but the word is getting out beyond the cannabis community. A number of companies are leading this research and the race is on to create the most innovative cannabis products on the market.

Scott Holtby is a Freelance Writer with a focus on Cannabis Industries



Topical Creams & Oils

One of the earliest examples of a cannabinoid delivery system is topical cannabis creams and oils. Originally starting off as a home remedy, these creams quickly caught on throughout the cannabis community. Topical cannabinoid creams give anyone full control of where and how to administer cannabinoids, opening the door to experimentation and a personalized approach to therapy.

While homemade potions are still popular, there is a growing trend towards brand name manufactured ones. For those willing to invest, advances in extraction technology have given companies access to extracts with much higher and purer levels of cannabinoids. These products offer a good introduction to cannabinoid therapies, but many companies are building on this technology to make more focused products.

CBD Chews & Gummies

Due to the demand for efficacy and biodegradability, companies have developed products like cannabinoid chews and gummies. Companies like *Cheeba Chews* have built diverse product lines focusing on a range of cannabinoids.

The advantage of chews and gummies is that cannabinoids are ingested directly into the body. Despite efforts to standardize labeling and dosages, there is still a risk of unreliability from many manufacturers. Often this is because companies are most focused on the recreational edibles business rather than medical cannabinoids. With stiff competition on the market however, that will soon change.



CBD Sub-Lingual Tablets

A further advance in technology is a cannabinoid-focused sub-lingual tablet.

Companies like *Alternate Health* (CSE:AHG, OTC:AHGIF) are developing patented delivery systems for cannabinoids with a focus on medical and therapeutic applications.

Taking this approach allows for products with precision dosages and the technology to isolate very specific cannabinoids and cannabinoid blends.

This is particularly valuable for medical practitioners who prefer to be accurate and conscientious with their prescriptions.

Cannabinoid Transdermal Patches

Building on this medical focus, *Alternate Health* is also developing a transdermal patch for cannabinoid therapies and medicine. Similar to sublingual tablets, patches give patients access to reliable and specific dosages of isolated cannabinoids.

Transdermal patches take cannabinoid delivery systems up another level, by offering a convenience factor. Patients benefit from the reliability of a gradual release of cannabinoids without the risk of skipping doses. Innovative companies are working tirelessly to bring these products to market, and are convinced that CBD products will be as identifiable as any other household healthcare brand in the near future.





CLOSING THE CANNABIS SKILLS GAP THROUGH EDUCATION

Cannabis is the fastest growing industry in the United States and it should be no surprise demand is surging for skilled workers.

Like other major industries, cannabis offers opportunities across a wide spectrum of specialized skillsets. Whether it's plant genetics or relationship marketing, companies are ready to realize profits by providing the education and training to support the industry.

Marijuana boom-times have attracted huge interest from people looking to work in the industry, but there remains a skills shortage when it comes to real vocational training. There are, of course, degrees and education that are related to the industry –

Nick Swan is an avid investor and advocate for Medical Cannabis Industries

like *Delaware Valley University's hydroponics program* – but as it stands there are no courses specifically designed for the cultivation of marijuana. Instead students must work with plants like basil, where many of the same principles can be applied.

One example of an attempt to address the skills shortage is a new school called *Medical Marijuana United*. For \$20.00 per month, students can access all seven of its cannabis-focused programs: *Legal Studies, Caregiver Certification, Budtender Certification, Manager Certification, Edibles Manufacturing Certification, and Medical Professional Certification*.

These courses offer an affordable alternative to traditional education that demonstrates a

unique commitment to working in the cannabis field.

In the future, more colleges in applied fields of science and technology will begin to gear programs towards cannabis, similar to mainstream wine and beer education and safety programs. The demand for knowledge is increasing and soon we will see more programs, classes and niche colleges offering education and training in the fields of cannabis science and technology.

This shift has already begun in the field of medical education.

For example, **Alternate Health (CSE:AHG,OTC:AHGIF)** has developed *Continuing Medical Education (CME) programs* for physicians and healthcare professionals, through their Alternate Medical Media subsidiary. These accredited CME programs are online learning modules, where credits are earned after passing short quizzes to test your knowledge of the topics. Programs are available online and already through mainstream universities.

Keep an eye out for companies like Alternate Health that understand the importance of education and who are leading the way in furthering marijuana educational platforms.

Visit alternatehealth.ca for more information.

Women In Cannabis



Chanel Jordan

Chanel is currently studying nursing in Fort Collins, CO with the intent to become a RN.

A California native turned Colorado edible chef with the hopes of spreading knowledge on nutritional health & organic cooking in the edible industry. Chanel's social media presence has inspired her to use her platform to educate others on the benefits on Cannabis and infused foods as a medical patient.

►► Why have you chosen this field?

I've chosen to work within the Cannabis community because I've seen and read the benefits of cannabis healing so many, across the world. Relocating to Colorado from a non-legalized state allowed me the resources I needed to pursue my goals of helping and healing others through infusing food! I've seen big pharma destroy so many lives in cities and states where that's all we have access to, this alone motivated me to find & help

educate the world about alternative medicine.

►► Tell us about how your business affects the Cannabis industry?

Terp Treats Co allows patients who are unable to smoke, to medicate with food, thus bringing another way for patients to medicate in our community! Preparing my gummies with organic ingredients & all natural fruit juice offers patients a healthy way to consume their medicine and dose properly. Using either THC or CBD, I've created a variety

of edibles that cater to a patient's specific need. Edible companies and chefs as a whole, allow for our industry to generate an even greater community of people who medicate with Cannabis.

►► Why do you feel it's important support research & development for Cannabis related industries?

We are always advancing, discovering new techniques and processes that we prefer, or exceed our previous expectations. It's so important to support Cannabis research and

development so we can notice and benefit from any changes or progression immediately. I believe this gives not only new, but current brands, dispensaries, or companies the motivation to maintain the quality of their product. As a community we need to support the work but more importantly the research for our medicine. Quality medicine cannot stem from routine or maintenance alone, constant support for the advancement and knowledge of Cannabis is essential to our industry!

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